VILLAGE IMPROVEMENT
AND
AGRICULTURAL EXTENSION

PRINCIPAL, TRAINING CENTRE FOR VILLAGE GUIDES
4 MAR 1955
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BY

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PUBLISHED BY
THE BANGALORE PRINTING & PUBLISHING Co., LTD.
MYSORE ROAD, BANGALORE CITY
1954

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PREFACE

In the present schemes of intensive rural development comprised by the Community Projects and the National Extension Service, it has occurred to me that the experience of an old agricultural officer in the popularisation and introduction of improved agricultural practices may prove useful in many ways, and, belonging as I do to this category of officers, I have ventured to bring together in this book my thoughts and experiences in this work during my service in the Mysore State. It happens that more than twenty years out of my long service of 35 years in this department were spent in this branch of popularisation or district work, which now goes by the novel and rather technical name of 'Extension' service, so that one feels much like the man who discovered that it was 'prose' which he had been talking all his life!

It may not be generally known that the Mysore State was the first in the whole of India to show its practical appreciation of the value of scientific research for agriculture and to appoint an agricultural chemist as the first step in the organisation of a department of agriculture. Important additions followed, notably the appointment of an entomologist and mycologist, and after the lapse of about 12 years, a district staff or what is now called 'extension' staff (according to American parlance) as distinct from the scientific or research staff was added. Though not by design, this was a natural sequence of development, as the district staff had at its disposal for popularising in the districts the results of a dozen or more years of research work by the scientific staff. Otherwise there could be little to 'put through' or only imperfectly-tested material which it would be premature and rather risky to attempt to popularise. After about ten years of service in the scientific section and

a few years of study in Europe and America, I had the honour of being appointed for service in the districts and had the distinction (and the handicap) of being the solitary member of the staff! For over twenty years thereafter I had the privilege of working as an extension officer, covering every district in the State, during which a wide variety of methods of popularisation and relating to every aspect of agriculture was tried, with varying degrees of success. To most of these, both the successes and the failures, reference is made in these pages.

Moreover it was during this period that the unique organisation called 'Economic Conference', which was a purposeful and methodical drive for achieving progress over a wide front and which has perhaps had no parallel anywhere, was launched by that far-sighted Dewan Sir M. Visvesvaraya and worked at fever heat during most of its life. There was nothing under the sun (it used to be said), which had any relation to economic development and no method which had even the remotest chance of success, which was not attempted. Agriculture was naturally one of the main fronts and I had my full share in the responsibility of working with many schemes, both practical and well-tested and those which were novel and more or less experimental but promising. In addition, the Conference had a special State-wide scheme relating to village improvement which comprised all aspects of village life, which was made the special concern of the local officers of Government and which for sometime at least was the sphere of great activity and the testing ground of many novel methods. All in all, the Conference attempted with all the zeal and the financial and other resources available at that time just the very things which in recent years are being attempted for the economic development of the country, for the uplift of the masses and for the betterment of the villages, under the ægis of the Union Government with funds provided of a colossal magnitude. The Mysore State, one is proud to say, has been administered as a 'welfare' State for many decades now (long before, indeed, the phrase

was brought into common use) and many ideas, schemes and projects which are being started now are several decades old in the State, some perhaps even half a century.

In my capacity as a member of Conference and as an agricultural extension officer out in the districts, my connection with these activities was very intimate and much of this experience is also drawn upon and referred to in the text. In recent years too, it fell to my lot to be the Chairman of the Agricultural Committee of the Conference from 1945 to 1952 and to be in close touch with the problems and schemes of these latter days also.

It should be obvious that the nature of the work of extension or popularisation cannot be the same in this country as it may be in Canada or the U.S.A. For one thing, while a farm there may be several hundred acres in extent (the average in 1952–53 for the U.S.A. was 215 acres) and one has to deal with only one farmer, as far as extension in such a farm is concerned, in Mysore the average is hardly 5 acres, so that one will have to deal with some 50 farmers for a similar area. Moreover even this average holding of 5 acres is not what would be called a farm but is just a number of fields lying scattered in different places, with the farmer himself and his family residing far away in the village along with his neighbours, whereas in the U.S.A. and elsewhere one sees regular farms, the whole of the extent lying in one block, with the farm buildings including the farmer's dwelling house situated within the farm itself, and all his cultivated land, dry, irrigated, pasture, wood lot, orchard, etc., lying within this area. An extension officer (or County Agent as he is called) has simply to drive up to the farm house to interview the farmer, to inspect his crops and livestock or machinery, suggest improvements and give all the help and advice necessary. He may even help the work indoors, repair a washing machine or set right the family telephone and easily become the friend of the family. What it is on the other hand, with the ryot in a Mysore village in contrast need not be described. The American

farmer moreover is educated and can make use of books and bulletins; and many may be new to farming and seek the help of text books and of the extension officer in contrast with his Indian brethren to whom agriculture is the ancestral profession. The approach and the methods and the technique of the extension work in this country have therefore to be very different, as I have no doubt, some of the American extension officers working in our midst should have discovered.

The Community Projects and the National Extension Services provide for and envisage the appointment of a large number of workers of different grades, such as village level workers, assistant extension officers, block officers, and so on, the bulk of whom will have to be men trained in agriculture and whose main function will be the popularisation of improved agricultural practices. The methods of extension and the results of past experience should obviously prove useful to them also.

Although the thoughts and suggestions to which I have given expression are the result of my experience in the Mysore State, they will in all essential respects apply to other parts of the country as well. The mentality of the ryots is the same all over the country and their reaction to the methods of approach and to the various suggestions made will be almost identical, wherever they may happen to be and whatever the crops they may grow. It is hoped therefore that such useful purpose as the book may serve will not be confined to the Mysore State alone but may extend to other parts of India as well.

The plan of the book is somewhat as follows: Part I deals with the all-important matter of irrigation, which is the foundation of the country's prosperity, and with the various other subjects comprised in village improvement schemes, such as village sanitation, and health, roads and communications, rural education, especially agricultural, cottage industries and spare time occupations, and co-operative societies. Part II deals with the methods of extension or popularising agricultural improvements, in all their

variety. Part III deals specifically with the various agricultural improvements which have to be popularised, comprising, firstly, those which are general and apply to all crops, and secondly, those which relate to particular crops, of which a few important ones are dealt with. Part IV deals with the kind of agency—executive and administrative—which has to be made responsible for the carrying out of the various schemes of village improvement.

No detailed or descriptive account of the various agricultural improvements in regard to crops or methods is attempted, as these can be dealt with only in a text book; such as are given are in the nature of short notes, with the details of which the agricultural officers concerned will certainly be thoroughly conversant. In fact due note has been taken of the fact that the projects and extension schemes provide for a number of technical officers and that their services will be available on the spot. This is especially the case in respect of the particular improved varieties of the crops to be grown and of the control of pests and diseases of crops. Moreover, there is quite a good bulk of the results of scientific work both in the laboratory and the field which are to be found in the reports of the different departments and in the agricultural journals, which however do not appear to have been taken up for extension work and therefore cannot be said to have passed the experimental stage. I have therefore had to confine myself to such results as are being already popularised and have now to be extended over wider areas.

I should apologise for the personal narrative which I have given but I have done so solely because it affords a picture of the background for the materials presented in the book; but for the somewhat essential need of such a background I should have refrained from doing so.

I hope that the book will serve the purpose intended and be a useful contribution to the great work of rural improvement now under weigh in the shape of the Community Projects and National Extension Services, which

are proposed moreover to be so expanded as to cover the whole country.

My thanks are due to the Bangalore Printing and Publishing Company, Printers, and to its Superintendent, Sri. C. Vasudeva Rao, for the neatness of the printing and get-up and the promptness of the execution.

A. K. Yegna Narayan Aiyer.

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PART I

I. IRRIGATION

Among the various schemes which have to be undertaken and carried out for the improvement of rural India on a wide and comprehensive front, irrigation will certainly be found to be one of the foremost importance. In a country like India, no single factor of crop production can lead to an assured and abundant supply of food as ample irrigation, and large and satisfactory sources of irrigation form indeed the foundation of the prosperity of the country. From the most ancient times the creation of new irrigation sources and the improvement of old sources have been recognised as one of the foremost duties of the rulers of the land, and no king has been considered worthy of his position if he does not create at least one such source. The following quotation may be illuminating:—" The excavation of a tank is one of the *Saptasantanas* or seven acts productive of religious merit " (Vijayanagar inscriptions). " The person who constructs a tank acquires the merit of performing an *aswamedha* " (*Mahabharata*). Even elsewhere as in the U.S.A., where the need is not so great, in recent years the importance of irrigation not only to ensure and maximise crop production but also to make crop production at all possible in many regions, is being recognised and vast schemes which serve the triple purpose of irrigation, electric power supply and flood and erosion control, have been carried out already, and more are still being planned. As witness the world-famous Tennesse Valley project already operating over a region said to be as large as Great Britain and the newly planned Missourie River Basin Development programme which is intended to irrigate 5 million acres of new land and supplement the irrigation of 2 million acres which now receive only an inadequate supply.

In the orient its importance has been recognised from time immemorial and the most ingenious systems of water

utilisation involving the terracing of miles of steep hill sides, and a network of canals with remarkable transportation devices, deep cuts, tunnels and aquaducts and between huge embankments have been adopted. Both kings and communities have vied with each other in the creation of such works, and hardly a single suitable site which could be utilised with the resources of those days has been neglected and left untouched. It is only such projects, it is stated, as were beyond their resources amazing though they were, and could be tackled only with the huge mechanical appliances of modern days, that remain to be undertaken at the present time.

It is no wonder that schemes of irrigation have been assigned the highest priority in the new plans of economic development and vast projects of far-reaching importance have been planned or already taken up, which will prove a boon to the country and form its most valuable and permanent asset. These projects when fully completed will indeed form the most outstanding monuments to the era of political independence attained by the country.

It may be added that irrigation forms not only the deep concern of a welfare state but is one of the benefits which the rural public perpetually urge. No petitions or representations are more frequent or more insistent than the demand for the creation or improvement of irrigation sources. People also back up their petitions by the assurance that they will bear their part of the expenditure, by way of paying their contribution or " betterment levy " willingly. It is worth noting that at least in one part of the country (Tirunelveli, in the Madras State) the people concerned have actually raised the funds necessary for the execution of a project, so that Government may not plead lack of funds for not taking it up or for delaying it. It is hardly necessary however to labour the idea, that from the point of view of the production of ample food for not only the present population but also for the rapidly growing future population, for the production of the numerous commercial crops which

form the raw material of our industries, the generation of electric power for running our factories and for the many amenities of modern life which it makes possible, and the prevention of flood damage and soil erosion, the subject of irrigation should receive our foremost attention.

In respect of such increased crop production, moreover, irrigation is of such overshadowing importance that most of the improvements suggested as the result of scientific research whether in manuring, improved varieties or disease control and so on, will prove infructuous without adequate irrigation, whereas the latter alone can result in considerable benefit in the shape of an assured crop and in a materially increased yield, so much so that it is not unusual to hear the rather cynical and partial truth, "give the ryot enough irrigation water and manure, and he can raise as good a crop as you can with all your scientific research." This is only a somewhat forceful way of emphasising its importance, and can in no way be taken to deny or belittle the aid of scientific work, which coupled with irrigation can produce remarkable yields.

Increased crop production thus obtained with adequate irrigation can to a considerable degree obviate the need for large areas for crop production and may be the means of setting free much-needed areas for other crops as well,—a matter of great importance in the apportionment of cultivation between food crops and commercial crops. "Irrigation" as was observed by Sir Charles Trevelyan, "is everything in India; water is more valuable than land because when water is applied to land it increases its productivity at least sixfold, and generally makes a great extent of land productive which otherwise would produce nothing or next to nothing."

A rather curious and amusing instance of how this has been realised in practice is afforded by what has been happening in the U.S.A. in the last few years. In order to get over the difficulty of the huge and recurring surplus production of grain and the liability for the State to buy it at the price

support level, Government has been trying to cut down production by the expedient of permitting farmers to grow them on a limited area permitted according to a sort of quota system. Farmers however did not take it lying down but have with characteristic ingenuity succeeded in circumventing the measure by installing irrigation systems and almost doubling yields and thereby producing as much if not more on the restricted area, than they were producing on a much larger area before the restriction was imposed. In the crop increasing power of irrigation therefore, they have discovered a strong weapon to defeat Government with in this campaign !

Types of irrigation schemes and some points to be attended to.—The irrigation schemes already planned and taken up for execution and those programmed for the future relate firstly, to the large almost colossal work of constructing dams across the great rivers and the creation of immense storage reservoirs or lakes, secondly, the construction of irrigation tanks of a smaller order at suitable sites across the valleys of the smaller tributaries and rivers and thirdly, the improvement of the numerous tanks already in existence but which have deteriorated by accumulation of silt, lack of repairs to bunds, sluices, weirs, etc., or the choking up of the supply or feeder channels.

The first type is really too large to be taken up by individual States and these dams are constructed only by the Central Government solely by itself or conjointly with the States; their scope is very wide and all aspects are thoroughly considered and provided for. Still it may be relevant to mark out and emphasise a few of them which, it may be found, are applicable to the second ones as well, in certain respects.

Provision of drainage.—Provision should be made for adequate drainage in the lands commanded by the project simultaneously with the construction of the canals or at any rate before the lands are given over for cultivation. Once the lands get apportioned and come under individual

ownership, it will be next to impossible to open out suitable drainage ditches. The need for drainage is not sufficiently recognised and the lack of drainage is a great drawback in all irrigated tracts; it lowers the yield of crops materially, and eventually makes it even impossible to grow any important crops, and many low lying places may even become converted into swamps. Provision will have to be made in good time for not only the main drains but also for sub-drains at suitable and regular intervals of space all over the region which will serve the needs of large blocks if not of fields.

Roads, bridges, etc.—It will be desirable to lay out the region into blocks of at least five acres, so that holdings will comprise fields or compact blocks of five acres or multiples thereof. Roads and path ways should traverse the entire area, so that as far as possible, every block may abut on a road, and therefore be easily accessible by cart or even by motor, for the transport of produce and manure. In practically every irrigated tract this is a great desideratum and operates very materially against efficient farming. The provision of bridges across the network of canals, both the main and the distributaries wherever they may be necessary, is also important and should form a necessary adjunct to a road programme, so that farmers may be spared needlessly long and roundabout routes to reach their fields.

Compact holdings.—Whatever may be the minimum area adopted, whether five or ten or more acres per holding, they should form indivisible units, being owned, farmed, and bought and sold only as such and not cut up into parts. No temptations or clamour should prevail and be allowed to bring about a disruption and scattering of ownership. The advantages of such blocks under individual ownership in irrigated tracts are even greater than on dryland areas, among which may be mentioned a simplicity in the irrigation programme ensuring satisfactory supply, the avoidance of excessive water, and the development of swamp conditions endangering the health of the people.

Reserved areas for research farms.—Before the lands are disposed of to farmers, an adequate number of blocks situated in different parts of the tract should be reserved, one or two to serve as experimental farms for research and a good few to be worked as seed farms. The trial of new methods, new crops, manurial requirements and the evolution of superior varieties and similar activities relative to the crops of the tract will be carried out on the former while the latter will serve as farms for the multiplication of the superior variety and the production of seed on a large scale. The popularity of superior varieties has become very general and there is a very large demand for seeds which cannot be satisfactorily met. Seeds have often to be purchased from growers, there is no guarantee of quality and the supply is attended with considerable risk and, even at that, is not sufficient to meet the demand. In addition to the building up of private seed farms through subventions or other help, it should be part of the future work of the agricultural departments to work their own seed farms as well and sufficient land should be therefore set apart for the purpose well in advance.

Incidentally these farms would serve to test the suitability of any particular irrigation programme, the quantity of water to be given, the period of non-irrigation interval which can be allowed without detriment to the crop and so on, which are points on which the ryots do not see eye to eye with the irrigation authorities.

Irrigation in blocks.—In order to utilise the water in the most economical and profitable manner, to prevent water logging and swamp conditions, to avoid the risk of malaria to the population and the damage to the soil which may arise by growing rice every season, what was called the block system of irrigation was designed and enforced (in the Irwin Canal—now Visvesvaraya Canal—tract in Mysore) which also prescribed a rotation of crops suited to meet these ends. Under this system the blocks received a full continuous supply in the first year and were expected to grow rice in that

year; in the next season they received no irrigation and were expected to grow a dry crop; and in the third year they received intermittent irrigation frequently and adequately for a whole year and sugarcane was expected to be grown. This was a three year rotation, and though the crops specified or suggested were only rice in the rice block, dry crops like ragi, jola, any of the pulses, oilseeds or green manure crops on the dry block and only sugarcane on the full year intermittent irrigation block, others whose water requirements were similar, such as turmeric, Cambodia cotton, etc., could be grown as well. The system ensured to each holder one crop of rice, one dry crop and one sugarcane crop once in three years and served the other objects also admirably. By another restriction, a dry belt, *i.e.*, a belt with no irrigation, of about a furlong in width was maintained all around the villages, thereby guarding them from excessive moisture in and around the houses, and the breeding of mosquitoes. Needless to say that neither kind of regulation in irrigation was liked by the cultivators who would prefer the freedom to cultivate as they pleased, and the irksomeness and the restrictions were greatly resented. In the face of continued opposition, though sometimes extenuating circumstances did exist, the strictness came to be relaxed gradually and neither is now enforced in the same way as in the beginning. Among such circumstances may be: (1) the clamour from important persons to ratoon their sugarcane crop, (2) the factory (if there is one) may be unable to cope with the cane owing to a specially heavy crop or trouble with labour or machinery and (3) a temporary but supreme need to grow grain crops. All these however are very exceptional and should by no means be allowed to militate against the general imposition of the system. The advantages are so great in respect of the conservation of water and the health of the people, that the system deserves to be adopted wherever these large projects are undertaken, with any suitable modification that may be necessary and then enforced strictly.

Land clearing and levelling for settlers.—In many of the tracts being newly brought under irrigation, the terrain may be uneven and badly eroded or comprise much sloping ground, and in both the cases the surface will have to be levelled or laid out into terraces of maximum width possible, the pits and gullies filled in and the ground made easy for cultivation. Elsewhere there may be much scrub or other tree-covered jungle, or the land may be badly infested with kans and other deep rooted grasses, difficult of eradication. These will also have to be removed so as to clean and clear the land for cultivation. Even where all facilities are provided, it is difficult to attract settlers, as the disinclination to move into unknown tracts is very strong and even when the projects lie in the midst of settled country, decades sometimes elapse before all the land is brought under cultivation. It will be well therefore to have all such land worked by heavy earth moving tractors and cleared and levelled, so that settlers may not be put to this additional and difficult task or the fear of the expense keep them back.

The problem of submerged villages and displaced villagers.—The problem of the submergence of valuable cultivated lands and villages in the waterspread of new reservoirs is an important one, especially in an ancient and well settled country like India and it will have to be carefully considered whether the advantages of the project will compensate for and greatly outweigh the disappearance of these well cultivated areas, comprising old and very valuable arecanut and other gardens, and for the distress and difficulties of the villagers who will have to abandon their ancestral homes and move into new regions among new communities and strangers. All this is well recognised and attended to, but we may point out and stress its silver lining, *viz.*, the opportunities and scope which it affords for the laying out of well planned modern villages and houses, with facilities for amenities, a clean slate so to speak. The opportunity should be availed of and *pucca* houses built on well laid out plans in such villages and assigned to the evacuees in lieu of a

compensation in money or materials and this will greatly facilitate this moving out. The human aspect of the problem is really a sad one, for despite the dirt, meanness, poverty and disease, the people love their villages and their ancient lands and gardens, and even landless labourers would prefer to live there, may be on half a meal a day, to moving out and settling in far-off places, however attractive the conditions may be. I have heard old people compare it to the wars and invasions of the olden days, when they were driven out or fled for safety to the forests. Readers of "T.V.A." by David E. Lilienthal may recall how well this has been provided for in that country by comparing old farmers' houses with the new ones built for them, which he strikingly illustrates, pictorially. It requires considerable harshness almost amounting to heartlessness in enforcing the eviction, and no amount of help or concession will be too much.

Provision for grazing areas.—In the channel irrigated tracts, great difficulty is felt for the grazing of the village cattle; during the cropping season and during the preparation for the next crop which follows soon after and during the growing of the green manure crops preparatory for the next crop of rice, there is practically no large area available for grazing, and as a matter of fact not even for serving as exercising ground. Ryots in such tracts cannot keep many cattle and there is always a chronic deficiency of cattle manure to be faced. The same difficulty is bound to arise under the large new irrigation projects also, where practically the whole of the accustomed grazing areas are likely to become cultivated land. Added to the general custom of not growing any fodder crops, this difficulty will become very serious. It will be necessary therefore to make timely provision for grazing land and also if possible for introducing the practice of growing fodder crops in all these areas, before throwing them open to cultivation. If in the rotations prescribed (speaking of Mysore conditions) such as, a dry crop followed by sugarcane, and then by rice, it is made a condition that the dry crop should be a fodder crop like fodder jola it will

prove a great mitigation. The dry area in the rotation is dry only in name, for it is surrounded by wet lands and has always more moisture than what a dry crop ordinarily gets and it will be therefore possible to grow very heavy crops of jola (fodder juar) under such conditions. Further it may be desirable to reserve as permanent pasture land a narrow belt of the channel *achakat* itself, either the bottom-most stretch or the topmost, for a width of some hundred feet or so, and running all along the length of the channel through its turns and twists. This will give every holder some extent of pasture land, which will be green and growing throughout the year and quite flush during part of it. It will mean a substantial solution of the fodder and grazing problem, and the tract in fact may well prove a cattle paradise and a great dairying section, and is therefore suggested for consideration. Of course it will mean also a loss or reduction in the area available for irrigated cultivation, but that will be the price to be paid for this very important and much needed facility. Some such arrangement will have to be made so that both cattle and the crop raising potential may benefit. Otherwise cattle keeping even in moderate numbers will be next to impossible and will accentuate the difficulty for cattle manure. As a matter of fact in every one of the large irrigation schemes it may be necessary to reserve sections of 2,000 or 3,000 acres to be utilised for dairy farming and to be worked as such by up-to-date methods. Milk production sufficient to meet the needs of the armed forces quite as much as of the civil population can be secured by no other method.

Soil survey.—It may be also advisable especially where the tract is comparatively flat to conduct a soil survey, not merely of the usual soil and sub-soil kind but of a deeper profile extending to at least three feet in depth, if not more. If the lands are on a slope and have to be terraced, then the survey will be ordinarily of less value, on account of the displacement or obliteration of the surface soil involved in the terracing process but even in that case a study of the deeper profile may prove useful, especially as permanent data.

Tree planting on canal banks.—Provision should also be made for the planting of suitable trees along the roads skirting the canal, wherever the width of roads will allow. These trees should be low growing with a root system capable of exerting some binding effect on the canal embankments, and also affording green leaf manure from the seasonal loppings. Honge (*Pongamia glabra*) trees are very suitable and are indeed already made much use of for this purpose. The newly recommended *Glyricidia maculata* will also be found suitable and both trees are moreover excellent honey forage as they flower profusely and are alive with honey bees at that time. The trees may have to be planted and looked after by the Government staff itself or be left to the owners of the adjoining fields, the ownership and the right to use of the leaves and the produce being granted to them, with suitable guarantees for replanting in the event of the death of the tree.

Improvement of Old Tanks

Apart from the very large irrigation sources now under construction and similar and comparatively lesser ones in progress and planned for the immediate future, to some of the aspects of which reference has been made above, there is very great scope and need for the improvement of the already existing irrigation tanks, without however altogether excluding the chances for new tanks of moderate dimensions. In Mysore especially practically every conceivable site has been utilised and the numerous streams and tributaries and streamlets in the river basins have been dealt with. Their number is very large, all of them are very old and serve communities which have been settled for centuries. The condition of some, perhaps a large number among them, is deplorably bad and is a perennial subject of complaint. Perhaps their very age accounts to some extent for their condition, but there are many other causes of a remediable nature which are operating. The feeling of responsibility on the part of the villagers has much weakened if not

vanished, due to the changes in the system of village administration, and this has played and still plays an important part in bringing about this neglect. Due to frequent seasons of low rainfall over a long period of years, the tanks do not receive enough water for crop raising and this creates an attitude of helplessness and frustration which takes the heart out of the villagers and which by no means is conducive to their taking up any improvement. Though communities are remarkably resilient, disturbances, banditry, epidemics and such calamities in the past have in some cases broken them beyond recovery and tanks may be seen in such places practically abandoned and silted up flat. Although these may be exceptional, practically all of them have suffered so much that their usefulness has materially gone down.

The fact that though small they are so numerous and serve a large part of the population makes their improvement an imperative need and one which will benefit a large part of the country. The restoration of minor tanks, as this subject has been called, has been a concern of Government for many years and action has been and is being taken in some order of priority; but generally things move so slowly due as much to insufficient funds as to red tapism that the turn of some may come only in the Greek Calends, by which time the tanks restored may need attention again! Now that ample funds are being provided almost without limit, the Community Project authorities cannot do better than make a careful and immediate survey of the tanks needing attention and take up the work seriously.

At the same time the survey should follow up the course of the small tributaries and sub-tributaries and every branching however small, so that eligible sites if any can be located for small tanks and even *kattes*. These may not be perhaps of much irrigational value but will serve nevertheless a useful purpose, especially as water is a scarce commodity in many tracts. They will serve as drinking water ponds for cattle, tend to keep the moisture in the soil and help the growth of grass and other vegetation, and to supply underground

water and make the sinking of wells possible or at least to keep up the level of water in the existing wells. Above all, such dams and embankments across these water courses, will prevent scouring and soil erosion and the consequent silting up of tanks below. If however for some reason, sites suitable for a moderately good irrigation tank at least should be found still awaiting utilisation, then the survey will prove very fruitful, and the construction of such a tank may be taken up.

More than for any of these, however, the scope is for the improving of the existing tanks and this is indeed a crying need. These improvements will be found to consist mostly of the strengthening of the dilapidated bunds, repairing leaky sluices, the removal of silt and deepening the tank beds as far as possible to their old capacity, repairing and raising of the waste weirs and repairs to the feeder channels. All these are usually examined and catalogued for due attention in the minor tank restoration programmes of the States, but besides emphasising that the works should be taken up and executed promptly, a few remarks may be usefully made in respect of some of them.

Desilting of tanks.—The silting of tanks is a slow process worsening progressively through many years, with the yearly accumulations. Not only therefore must the desilting work relate to the removal of the accumulation of many years, but must be attended to as a yearly operation, when the tank goes dry and permits of such work. An admirable old practice of these village communities was such removal, the soil so removed being carted to the high lying dry lands or to the wet land fields as may be required, so that two objects, *viz.*, the removal of silt and the manuring of the fields, are attained at the same time. Something must be done to restore this practice; in fact a live village organisation brought about as the result of the Community projects will find ways and means of carrying out the work according to the old practice. It may be added that a good extent of high lying land which has remained uncultivated either as scrub jungle, or pasture

(so called) or boulder-strewn waste land, has now come under the plough, as the result of the 'Grow more food' campaign and the jungle clearance and the yearly ploughing is aggravating the evil and making it therefore imperative that the old customary silt removal should be restored.

The silt removal should be a well-organised work carried out on a common plan so that silt trenches are not dug haphazard just as each one pleased. The trenches should be made to run across the line of inflow, so that they may act as traps and prevent somewhat its movement to the sluice end. For the same reason it is also to be recommended that the far end of the water spread or catchment be planted up, so that the trees may likewise act as silt traps and prevent the rapid flow of silt-laden water into the tank; honge trees (*Pongamia glabra*), wild dates, and *Acacia catechu* are commonly favoured for this purpose.

Repairs to bunds.—The strengthening of the bunds by means of soil binding vegetation is a well recognised form of tank improvement and where this has been neglected or when bunds are repaired and renovated, this sort of vegetation should be established. Most of the grasses will serve the purpose admirably, as their root system is fine, dense and well spread, without going deep. Any one trying to pull out a well-grown ragi plant can easily convince himself of the effective manner in which the roots bind the soil. It will require a strong man to pull out a plant, root and all. Tree vegetation such as *honge* in many places and the palmyra palm in others are also favoured, the former sending down roots somewhat deep while the latter has a shallow and comparatively slender root system.

Raising the waste weir level.—The increasing of the capacity of the tank by raising the waste weir is a rather difficult problem, even as a temporary expedient but certainly when it is intended as a permanent improvement. Objections may come from landholders of both the upper and the lower tanks. The former will urge that the lands at the tail end of their *achakat* will become submerged or badly

water logged, although in the case of a temporary raising they may be agreeable, as they can always erect a temporary bund and prevent the water from backing up. If it is to be permanent, then their objection will be insuperable. Similarly the landowners of lower tanks may also urge that such raising will deprive them of part of the water to which they are entitled infringing their riparian right; temporarily however in years when the rainfall is superabundant, they may not raise any trouble. The improvement therefore will have only limited scope in the case of this type of 'serial tanks' but in the case of other tanks will constitute a major improvement and will have to be seriously considered for practical action.

Wells and Lift Irrigation

Unlike the irrigation sources considered so far, whether large, moderate or small, where water flows by mere gravitation and involves no further trouble, work or expenditure on the part of the cultivators, wells and water sources of a similar kind have the peculiarity that the water has to be raised to the surface from underground from varying depths by appropriate water lifting appliances. Their special advantage is that they enable the farmer to be an independent person, in no way dependent or linked up with the co-operation, willingness or convenience of the village community, nor with the customary village practices in regard to the crops to be raised or the manner of raising them. A farmer owning a good well with plenty of water at a reasonable depth and commanding about three acres or even less is a lord in his own domain. He can enclose his holding, he can erect a farm house for himself and his family, conserve all the domestic manure supply, give ample supervision both by himself and his family, will have no need to walk and carry his plough and lead his bullocks daily to and from his village and his lands, can grow a variety of crops according to his choice and not be limited to a single crop which all his neighbours may grow, can have his crops

standing without fear of cattle grazing even in the off or post-harvest season, can grow sugarcane and other long season crops and can supervise his crops in all stages of their growth almost from his door step; he can in addition keep a cow, some poultry or sheep, a hive of bees and even a pig or two; he can raise his own vegetables, and even a few fruit trees, in fact can be as independent as may be possible for one of his kind.

Good irrigation wells form far and away the best insurance against crop failure and ensure for the cultivator food for the family and fodder for his cattle. If moreover the water lifting appliance consists of only the ordinary bullock mhote, then the system becomes an admirable almost invulnerable cycle, the produce of the land supporting both the family and the cattle, who help to raise it. No wonder wells form the most popular and coveted investment of the ordinary cultivator. In the days of high prices of produce, before wages and the price of goods caught up with them, when the ryots enjoyed an undreamt measure of prosperity, I have seen in a large number of cases that the money they made was utilised for the sinking of new wells; it was only where there was no scope for such investment such as in the large channel irrigated tracts, that it was utilised for extinguishing debts, many debtors to the Land Mortgage Bank repaying several annual instalments in a lump in advance, much to the embarrassment of these institutions. Wells are moreover within the means and capacity of the ordinary individual; they can be invaluable where there are no other sources of irrigation and where there are other sources they can form a very serviceable adjunct. Their multiplication makes the benefit of many irrigation schemes broad based or shared by a very large number of people.

It is therefore a matter for much gratification that in the new plans for economic development, their importance is fully recognised and very large and adequate sums of money have been provided and that wells of many types, small and large, shallow and deep, not only the small ones

serving a couple of acres or so, but also those tapping deep water-bearing strata by means of deep bore or tube wells are to be taken up. We shall now deal briefly with these different kinds of wells.

Government concern and action.—Governments have always recognised their responsibilities in the matter of assisting farmers in sinking irrigation wells, especially after a period of drought and famine; and though spasmodic, their interest has never abated. Their aid generally took the form of a money advance or *taccavi* loan, for this purpose, which indeed forms to this day practically the only object for which the loan is taken, despite its notoriously cumbrous and dilatory formalities. At one time in Mysore some of the districts had a special officer whose duty it was to investigate applications for loans, the creditworthiness of applicants, to decide the amount and arrange to disburse it without leakage, to see that the money was utilised for the purpose stipulated and to supervise its recovery on the dates of the instalments. Later on Government especially in Mysore, took a more direct interest in the matter and afforded technical assistance for deepening wells with special mechanical appliances, for the supply of concrete curbs to prevent caving in, for pumping and unwatering wells during the construction and so on. Still later came the regular well sinking machinery for the putting down of bore wells to tap very deep levels, which were hand-operated first and later engine-driven like the powerful Calyx drills. Pumps and pumping machinery of appropriate kind were also supplied and fixed. Drinking water wells claimed the first priority for these outfits, for there was dire need in many villages where the usual open wells were either *non est* or were so deep that it required a cartload of rope to bale the water out, woefully scanty as it was. Well sinking establishments still exist in these States, perhaps in a state of suspended activity but full of life and eagerness to spring into action with the necessary stimulus or provision of facilities. Everywhere a good deal of work has been accomplished

which must be considered very creditable considering the handicaps under which they have been working, mainly one of insufficient funds. I have referred to this matter at some length so that in the big leap that is now being taken winged with a plethora of funds, the past may be remembered and a connection kept up.

The subsidiary well and its usefulness.—Wells for irrigation may be either independent or subsidiary. The importance of the former is of course well recognised, so much so that the term ' well ' generally signifies only that type of well. Nevertheless the latter kind also possesses great advantages and may be briefly referred to. These wells are dug on land already commanded by tank or channel irrigation and serve as a subordinate or supplemental source, when the need arises. It is not unusual that irrespective of the quantity of the water in the tank practically the whole area commanded by the tank is sown to rice, with the result that the supply of the water in the tank gives out towards the end of the crop season, when the crop is in full earhead, ripening and becoming ready for harvest in a few weeks. An irrigation or two just at this critical stage may mean all the difference between a full crop and no crop, and such irrigation therefore assumes a particular and decisive importance. Moreover a supplemental well of this kind will enable the owner to raise his nursery well in advance and be in readiness to transplant out in the field as soon as the tank receives sufficient supply, gaining thereby quite a month. Such a procedure will largely reduce or avoid altogether the risk of even a partial failure which may occur owing to a short supply in the tank towards the end of the season. The nursery can also be put down in a somewhat elevated place and irrigated by a suitable water channel or even by hand watering if need be, so that this kind of nursery grown high and dry, so to speak, which is one of the special features of the Japanese and Spanish methods of rice growing will be made possible. If the owner could only fence a fairly large area round the well, a green manure crop can be grown with

moderate irrigation; this may also be manured advantageously with superphosphate of lime. This sort of superphosphate manuring for rice by using it to raise a big crop of green manure and withholding it entirely or in part for the rice which receives the green manure has been found an excellent practice in rice cultivation. All these important advantages can be secured only with the aid of supplemental irrigation wells.

In the tank irrigated areas especially in Mysore, such wells may not be good sources of water, tapping springs and affording an abundant supply. They will in most cases be only percolation wells, the water level in which will rise and fall with that of the water in the tank, even drying up if the tank continues to be dry for many months. This however seldom happens under ordinary circumstances and the water in the well continues to be serviceable for a long time, at least sufficiently for the purposes described. They are moreover inexpensive to dig, and if nothing very permanent is attempted, may be a mere excavation of moderate depth. They will be quite within the means of the cultivator and even if not, only a very small sum of money will be enough to help him to dig one.

On the other hand in certain parts of Madras as in the Tanjore delta it has recently been discovered that it is possible to tap perennial supplies of water almost like Artesian springs, by means of "filter point" wells, which are similar to but far smaller than the great tube wells of the U.P. or likewise of the regular Artesian wells. It is reported that a large number of such wells are being put down and that more are contemplated. These wells serve a different purpose from the supplemental wells which we have been considering, because they are for the purpose of raising a full additional crop under irrigation in the fallow after rice. They are also of such a large capacity that they can supply the needs of several cultivators. American cotton is being recommended and grown largely and thousands of bales are said to be produced already, with prospects for more.

Of course this is a novel procedure, the land being put to very intensive use, without a rest and it would have been far better if a renovating leguminous fodder crop is grown instead and some amount of mixed farming with dairying practised. But cotton is an excellent money crop and money is what people are after. Moreover it meets part of the shortage of cotton in the country, in which the shortage of every kind of crop has become chronic. However this is a digression and does not affect the main theme of the need for subsidiary wells, which should be encouraged in every way.

Independent wells.—As regards independent wells, the need and importance of which has already been pointed out, the most notable are the great tube wells of the U.P. sunk in the Gangetic alluvium, which are very deep and almost inexhaustible. They are more or less of the order of important irrigation schemes, each is capable of irrigating hundreds of acres and serve therefore the needs of a large number of farmers like a major irrigation tank. They have the advantage that they do not swallow up great areas of land with their water spread (which is generally just about the same as the area under irrigation) nor give rise to the problems of submergence, etc., nor do they depend much upon the rainfall of the year. These immense areas of subterranean supplies have already been largely exploited and the tube well system in that State with the electrically driven pumps and power supply arrangements forms a conspicuous feature in the landscape and has become the most important factor in the growing prosperity of the people. Of course such wells are possible only in areas of a similar type, and the location of such sub-terranean water-bearing strata and of the abundance of the supply therein can be ascertained only by systematic hydrographic surveys.

It is interesting and heartening to note that " the Government of India have entered into an agreement with the U.S. Government under T.C.A. programme for the construction of 350 exploratory tube wells in 16 States to obtain geological and hydrological data required for a sound development of

ground water resources." We may add that this exploratory survey of ground water resources, referred to above, should also cover the plateau of Mysore and the districts of southern and central Maharashtra and the districts comprised in Rayalseema. These are the tracts where deep wells tapping good sources of subterranean supplies are bound to result in great benefit, and to save them from the fear of the frequent famines to which they are subject. It is considered that the geological formations here preclude the possibility of such water bearing strata existing, but this finding is however not based upon surveys of the kind now planned. In fact many deep wells have been put down with success in the Bombay, Deccan and Mysore, but these are comparatively of moderate depths and supplies. In one well in Mysore even water under pressure has been tapped, contrary to expectations. It is not unlikely therefore that these up-to-date surveys and very deep probes may discover promising sources. In any case it is highly desirable that these tracts should be included in the surveys, if they have not been included already and secure the benefits thereof. Moreover "a scheme for the drilling of 965 tube wells at an approximate cost of Rs. 4 crores was undertaken in 1950 (U.P. 440, the Punjab 225, and Bihar 300 wells) and of these 910 wells have been drilled so far (January 1954) and the remaining will be completed in the near future. In addition, a further project for the construction of another 2,650 tube wells in the States of Bihar, the Punjab and Pepsu has been taken up by these Governments at an estimated cost of Rs. 16·41 crores" (Press Report, January 1954). This is all to the good and one only wishes for their speedy realisation. We may also add that these are all planned at an all-India and State Government level and on a vast scale, and action of a similar kind but on a smaller scale is also called for urgently in respect of wells for individual owners and at the village level. The scope in this sphere is practically unlimited and there is no other way in which the bulk of the dry areas, which form quite five-sixth of the total area

under cultivation, can be protected by irrigation. All efforts should be made therefore to increase their number and their usefulness or capacity in the villages, and especially in the chronically dry areas subject to frequent famines, so that as many holders as possible may be provided with a good irrigation well.

Government aid.—The assistance by Government in this work for these tracts may take the form of (1) loans at concession rates of interest repayable in easy instalments; (2) subsidies or outright grants of varying amounts; (3) a technical agency for assisting with expert help and appliances such as the supply of concrete curbs where they are necessary, portable pumping sets to unwater the wells as the digging proceeds, drilling, dynamiting, etc., when hard rock is met with and has to be cut through and so on. The greatest scope will be probably for the digging of the ordinary type of open wells with a depth not exceeding 30 feet capable of supplying water some 15 feet from the surface of the well. Such wells can be provided either with pumping outfits or with *kapile* mhotes or both if necessary, with the obvious advantage of being worked by bullock power either entirely or at an emergency or breakdown of the pumping machinery.

It may not be possible everywhere to dig such wells and tap water at the abovementioned depth or in sufficient quantities; in fact on the Mysore plateau, the Southern Mahratta country and in several such tracts good irrigation wells of small or moderate depths are rarely possible, and deeper strata with water-bearing veins or other formation will have to be reached, hard sheet rock will have to be drilled through and deep "bore wells" with the necessary pumping machinery will have to be put down. All this is work for an expert agency, such as exists already in many States; the service is charged for at fixed rates according to the hardness of the rock and the depth, and this service has been largely availed of for wells for domestic supply more perhaps than for irrigation. It may be found that many existing wells may be improved and made to supply

a larger quantity of water by the putting down of bore holes through their rocky bottom, of varying depths. This is also a service to be undertaken by the same agency. The main point is that an active approach should be made to ryots to persuade them to go in for such irrigation wells rather than take a passive attitude and render service only when asked or applied for. To this end, what is required is a large strengthening of these agencies in respect of both staff and of equipment.

Water-lifting appliances.—The question of water-lifting appliances, whether by bullock power or by electric or other power, is closely connected with the development of well-irrigation. In the case of the great tube wells and of the deep bore wells of different types, bullock power appliances are obviously and totally out of the question, and power-driven pumping machinery alone has to be installed. In fact no important development of well irrigation can be thought of without resorting to such machinery. In the case of open wells with the water level near enough for lifting by mhotes and which are suitable therefore for bullock power, such power is what is commonly resorted to and the installation of pumping machinery and the dispensing with bullock power is a matter on which opinion is somewhat divided, some favouring one and some the other. A brief discussion seems, therefore, necessary. That bullocks have to be kept in any case for tillage, carting, etc., not to speak of manure and should therefore be made use of for working the mhotes also, that the straw and other bye-products of the farm furnish the fodder and no extra expenditure is necessary like charges for electric power, or oil or lubricants, etc., that the mhote is more dependable and free from the risks of failure or breakdowns, and that it is a more natural system of farming and that but for these there will be no profitable use for the straw, etc., are some of the arguments adduced in favour of bullock power. That pumping machinery on the other hand involves expenditure only when it is actually working, unlike bullocks which have to be fed and

therefore involve expenditure whether they are working or idle, that costly mhote bullocks cannot be maintained on straw and the farm bye-products alone and that concentrated feeds will have to be bought as well, that straw and other bye-products can be fed equally well, if not more profitably, to dairy cattle which at present are badly neglected and that therefore no unused surplus of fodder nor a diminution in the manure supply need be feared, that machinery and power supply services have so greatly improved that no serious breakdown can occur now-a-days, and that above all the drudgery physical hardship and monotony of the men and bullocks working at the mhote gives place to the immense relief afforded and the possibility of working night and day if necessary without a thought of any physical strain or exhaustion, are some of the arguments in favour of power machinery. This relief from physical toil is no small matter nor one not worth considering in the case of even the agricultural labourer. In my visits to villages subsequent to the installation of pumping machinery in the place of the old mhotes, I have met and talked to many of these toilers, who have blessed the power (electricity) which has given them this undreamt of relief and have raised their hands in prayer for the boon conferred. As a matter of fact one wonders why, when in every walk of life in all trades, crafts and industries the machine has replaced man even in backward India, agriculture alone should exploit both animal and human labour and deprive them of this powerful aid. Apart however, from any theoretical special pleading for one side or the other, it is significant that the men concerned, *viz.*, the farmers themselves have taken a practical and realistic view and have gone in wholeheartedly for this sort of mechanisation. The well subsidies granted in the various States have been fully availed of and the concessions regarding the purchase of pumping sets have been more than fully utilised, the demand being in fact in excess of the supply. A writer in the *Hindu* hailing from the great well irrigated tracts of Coimbatore and giving facts and figures about these pumping

installations states that the prosperity of the tract has greatly increased and the standard of living distinctly risen after the advent of this improvement. So that, it is now only a matter of actively helping the ryot both in the digging of irrigation wells and the installation of pumping machinery in these and in the older ones. The rural electrification that is now going on apace is a facility of the foremost importance and will have to be availed of to the fullest extent. It is also both significant and noteworthy that pumps, engines and motors are now being manufactured in large numbers in India itself and that foreign pumping machinery of many designs are also being imported so largely that a very lucrative import trade in these has sprung up in the country. There are also contractors at present, both Indian and foreign, who undertake to put down bore wells and instal the necessary machinery and who are doing a good volume of business in the country, all of which indicate the extent to which the public is adopting this particular improvement. In the Mysore State itself 5,339 installations are already working and their number is rapidly increasing. It is needless to stress further the importance or urgency of this line of activity to be pursued by the Development departments in the various States. Irrigation and more irrigation and still more irrigation—that is what is wanted, and nothing can usher in an era of prosperity to a greater extent or within a shorter time and almost automatically than efficient irrigation.

In connection with lift irrigation schemes, reference may be made to the utilisation of the waters of rivers both in the flood season and subsequent to it, for being pumped on to cultivable land on the banks, for bringing them under irrigated cultivation. Some of these may be of the order of large irrigation schemes, as in the case of the *lankas* in the Godavari river, and elsewhere, and fit to be taken up on a provincial level, but there is scope for schemes of a smaller type also, especially where in the off-season there may be large stretches of water in the bends and deep margins of

rivers, where water remains permanently and from which enough water can be pumped up for moderately large areas of fifty or hundred acres, which may be suitable for either large individual landowners or for co-operative pumping societies. Surveys to locate available sites, and their utilisation may be included in the programmes of these Community projects, to be executed in due course.

II. VILLAGE SANITATION

The most common observation regarding the condition of all our villages relates to their sanitation or the lack of it. There is no doubt that most villages are filthy beyond words; the surroundings of the village right up to its entrance are kept in an abominably filthy state because these open places constitute the latrine for the village, where the excreta lie exposed, accumulate daily, the stink is all pervasive, and both the soil and the atmosphere are polluted, making it most disgusting to approach the village. Some one called it their first line of defence and one would certainly hold one's nose and even shut one's eyes as one approaches these villages. This appalling state of affairs is too well known and it presents a problem very difficult of solution. Though much is certainly due to the callousness of the people and their lack of communal sense, it must be noted that a great deal is also due to circumstances beyond their control which moreover are more or less interdependent. They are due to the type of village layout, the kind of houses built, the extent of space available as village site, the habits and prejudices of the people themselves, and the disgusting nature of the problem itself. The type of villages, and the houses and streets vary much from tract to tract, being largely determined by considerations of safety, the needs of the system of agriculture followed, and of the climate and nature of the terrain. Some have regular streets, the houses have spare space behind, separate cattle stalls, open yard inside, a back yard or open space for a straw stack, manure pit and latrine of sorts. Others may have in addition large courtyards, and attic or upper floor for the handling of arecanuts, or copra and for the storage of these and other produce, etc. Others may be just box-like structures packed together anyhow, with labyrinthine lanes where a stranger may get lost, the houses having but one opening, *viz.*, the front and both men and

cattle occupying this prison-like structure. Latrines are unthinkable, and sun or rain, in health or sickness, both men and women have to resort to the village surroundings. Even in cases where the houses have a latrine of sorts, the tendency is to go outside if at all possible, the reason being of course not to pollute the house if it can be helped. As a matter of fact the *shastras* themselves prescribe one's going out of the village for this purpose, prescribing even the direction and distance. Even in the larger villages and many towns the position is not very different, except that a sanitary staff of scavengers is employed and do the daily cleaning. Probably for a long time to come only this degree of improvement can be the maximum to be expected in the ordinary villages, even if they are shifted to new sites and new houses built each with its own latrine.

Some activity is in evidence in this respect, villages are being shifted to new sites or "extended" and rural housing schemes, sometimes worked by co-operative house building societies are planned, which may be trusted to take note of and provide for the sanitary requirements. In the existing villages where the houses are crowded together and are of the box type, in which latrines of any kind are unthinkable, some sort of common latrines, separate for the two sexes of course, with provision for daily scavenging or for mere earthen trenches, in which dry earth or ashes may be used after each visit, can be arranged.

That the material is of great manurial value and should be used for this purpose instead of being allowed to pollute the ground should be emphasised and should form part of the propaganda. As the result, it may be hoped without undue optimism that the village elders will make the arrangements suited to their own conditions, to this end. It is not as if the value of the material as manure is not known; on the other hand that has been and continues to be the method of disposal in every large town and village, and in the municipalities is a source of considerable revenue, as the right to collect and carry away the material is auctioned for goodly

sums of money. The coming in of the water-closet system in the cities and towns has been in one sense a loss of revenue to them, not to speak of the loss to the manurial resources of the farmers. Much has been said of the Japanese method of cultivation in recent months, but this particular aspect of that cultivation, *viz.*, the extensive use of human excreta and the care with which it is collected and husbanded, deserves to be popularised more than anything else. In China and Japan and in the latter especially, this is about the only manure available as cattle are not kept (and indeed cannot be kept); farmers' houses and farmsteads have small latrines, with the requisite privacy, abutting on the street or road and notices invite passers by to visit these and relieve themselves, of their "honourable excreta" and thereby confer a great favour upon "this humble worm of a peasant". So highly is this manure prized.

The steps to be taken for securing this kind of cleanliness in the villages will thus comprise: (1) to arrange for latrines in the new villages and the new houses to be built therein, (2) to arrange for scavenging in the present villages, whether from inside the back yards or from the open village surroundings, roads and pathways, (3) to arrange for common public latrines, preferably of the bucket type, in the villages where no latrines of any kind are possible as part of the houses, and for their cleaning and composting with earth or ashes, (4) to further the use of the material as manure, (5) to cultivate a sense of pride in the villagers in keeping their village clean, (6) to explain the danger to health by the pollution of the soil and of the water sources, and to discourage the habit of such polluting both by children and adults. This kind of educational propaganda is always necessary, because even where a latrine is provided, it is the surroundings that are fouled and the latrine itself is left alone and perhaps comparatively clean!

Sullage accumulation and drainage.—Second only to the above cause of the filth and insanitation of the villages is the lack of drainage from the houses and the streets. The

washings and the sullage from the houses are either led out into the streets or merely allowed to soak into such little open space as may be at the back of the houses, making both these places veritable cess pools and stink pits, often alive with disgusting maggots. In one sense it may be said to be the worse of the two causes, because while it is possible to keep the house free from the pollution of human excreta the sullage pollution is inseparable from it, and it will have to be dealt with only by regular methods of drainage. But drainage in the case of the towns and even of the larger villages is found much too expensive for their resources, and to be attended with other difficulties of an almost insuperable character; in the smaller and petty villages (and most of them are of this type) such *pucca* methods are therefore unthinkable. In these villages the washing necessary for the personal cleanliness of the inmates and of the house floors, cattle stalls and yards has perforce to be reduced to a minimum, almost to vanishing point; often the bathing and the washing of the face, hands and feet which is a ritual preceding a meal, are done outside the houses. Indeed even in a larger way, the difficulty and expense of drainage stand in the way of affording even a moderately good water supply to the larger villages and towns, because such a supply straightaway leads to a more liberal (or less scanty) use of water, with absolutely no regard to the slush and stagnation which follow in its wake. In the smaller villages the problem becomes still more difficult. Even when some kind of gutter is provided to lead out the sullage much of it simply stagnates and sinks into the streets; where even drinking water is scarce it is obviously futile to think of water for the flushing of drains.

Some simple method to meet the present conditions is a great desideratum and is really a challenge to our sanitary engineers to design a simple, inexpensive and serviceable method. Sometimes even when the sullage can be led out, and flushed as well occasionally, the difficulty of finding a suitable outlet and method of disposal arises. Perhaps

in some cases this can be overcome because someone or other may be willing to make use of it for irrigating some field near by, or in the alternative a small area of land can be acquired which may be made to serve as a soak pit and which can be divided into several plots to be served in rotation, so that the sullage may be absorbed and disposed of more effectively. In any case the mysterious but very effective purifying power of the soil affords about the most suitable agency for the disposal of the material. This indeed is being advised and demonstrated in the villages at present in the form of soak pits for individual houses which, as a cheap temporary measure, is probably being found moderately effective.

In the days of the old Economic Conference, this kind of drainage as a sanitary measure formed one of the important items of village improvement and some very good work was turned out here and there. I remember in one case (in the village of Kappalmadugu in the Mulbagal taluk in the Kolar District), a regular system of open drains, *pucca* U-shaped concrete built and cement lined drains, was constructed, unbelievable as it may seem, which served both as a sullage drain and a storm water drain. It was such as many a town could envy. For a small village it was an astonishingly striking piece of work and it won the prize for the best village improvement of the year; it was a feather in the cap of the Economic Superintendent and a great honour to the village patel. It just shows incidentally what can be done, surprisingly outstanding in character, if only the villages would interest themselves seriously in matters calculated to improve their condition.

Sanitation and the problem of the cattle stall, and manure pit.—The question of village sanitation relates in an equal measure to the collection and disposal of the excreta of cattle; in fact the cattle stalls, the drainage therefrom, and the manure pits are the matters dealt with by the rural sanitation laws, which prescribe how they are to be arranged for in order to safeguard sanitation, and what penalties are

imposed for infringement. This is however intimately connected with the subject of cattle manure and its supreme importance in agriculture, and even as long as some sixty years ago, Dr. Voelcker pointed out that these laws had not taken proper note of this aspect of the question and were to that extent not workable in practice, or were prejudicial to agriculture if enforced strictly. As a matter of fact they are not enforced in practice and remain virtually a dead letter. It is no doubt true however that the method of housing cattle results in what may be considered a very insanitary condition indoors while the open manure pits all around the village which in part of the year are stagnant pools of dirty water add greatly to the filthy conditions out doors. The problem is very similar to the one we have considered already in respect of human excreta and the solution too can come about only with the construction of a better type of houses.

In many villages in the eastern districts where the box-like type of houses is the general rule, the conditions are most aggravated. These houses have practically no opening except the front door, and the hole in the ceiling to let out the smoke from the kitchen fire is about the only free vent outside. In this dark dungeon-like houses not only does the family dwell but also the cattle, chiefly the plough or kapile bullocks and perhaps a buffalo or two. One will have to get used to the darkness inside before he can make out the cattle or any fixture inside, and the smell of cattle dung and urine, not to speak of the acrid smoke from the kitchen, by no means add to the attractions. And yet the inmates thrive, raise families, celebrate feasts, festivals and funerals, toil hard on the fields and at the mhotes all day long, and seemingly defy the so-called laws of sanitation. Asked why they do not stall the animals separately even when they have some space for doing so, they will put you wise and say that you know little about the care which the bullocks require. They must be right under the owner's eye, the manger seen to frequently, and likewise the water tub, so

that neither gets empty, and must be watched in fact like the children of the family, if not with even greater care. The safety of the animals and the care needed to look after their well-being are indeed the deciding factors in the manner of housing them. Even in the tracts where the houses are built differently with an open yard in the centre and where there may be a backyard of some size as well, the animals are housed only inside, so that they are securely walled in and right under the watchful eyes of the owner. In the malnad where the houses are of a still better and spacious type and where a large number of animals are kept by individual farmers principally for the sake of their manure, the animals are housed in stalls some distance from the dwelling part of the house, in specially constructed cattle stalls which are well and securely walled in, sometimes so completely shut in that the entrance door is the only opening. The risk of loss by cheetahs or tigers is great in these tracts and however securely the place may be guarded a hungry cheetah cannot be kept out, and at least in one case known to me a cheetah jumped in into the yard, killed and made a meal of an unfortunate cow but curiously enough was not able to jump out and escape, probably because there was not enough jumping off ground nor the pangs of hunger to drive him to perform the feat. Needless to say he was surrounded and shot. Cheetahs are known to put in their paws through any opening in the wall or above it and scoope out a mass of flesh from the cow he could reach. But cheetah stories apart, the point to be stressed is that the security of the cattle is the factor which weighs most with owners and demands that the stalls be as close to them as possible for efficient watching, whether the method conforms to modern ideas of sanitation or not. Even therefore when houses of a better type are built the stalls will have to be within the house itself for this reason, but suitably located therein, as for instance around a central yard, with the floor of the stall firm and water-tight, and provided with a gutter to carry off the urine with arrangements to collect it and transfer it to

the manure pit. The essentials of a good stall from the point of view of sanitation and of the collection of manure are dealt with separately under the head of "manures" among agricultural improvements.

The storage of cattle manure.—The storage of cattle manure is as is well known in open pits or mere excavations in the ground, which are protected neither against sun and rain by a roof nor against the flow of rain water by means of a bund or dwarf wall around. The manure and the sweepings are dumped in as they are and seldom covered and the pits themselves are scattered anyhow near to the entrance to the village or about the outskirts, so that by smell and by appearance they add to the general dirtiness of the village, besides in many cases breeding and letting loose a plague of flies. After the manure is removed the pits become festering pools as rain water collects in them, breeding mosquitoes galore, so that alternately they are fertile breeding grounds for both the pests. Even such as they are their number is not enough for the villagers and it is a difficult problem to find suitable dumping ground which will not be far away for the womenfolk to carry the manure daily from the stalls to the pits. It must be pointed out however that although these shiftless and wasteful methods are the general rule, there are villages and ryots whose methods are far better; the manure is supplemented by tree leaves, red earth and farm wastes of all kinds, they are kept well covered with red earth or tank silt, a low bund surrounds the margins and, barring a roof cover, they are fairly efficient. In the malnad the manure accumulates under the feet of the cattle along with much bedding material of various kinds, green leaves, dry grass, etc., and there is no question of loss such as takes place in the open pits. Within the last four or five years the system of composting is being popularised and although the practice among good farmers already approximates to this new system still there is room for the adoption of the compost method everywhere.

The problem is to find adequate space for manure pits for all the ryots of the village. Unlike the case of the disposal of human excreta, this does not depend upon the shifting or extension of the village to new sites, but can be arranged for in the present villages themselves. A sufficient area intended solely for manure pits will have to be acquired in one or two sides of the village and space enough for pits allotted, just as house sites are allotted. The grant may be made conditional upon the pits being constructed in an approved manner, with a roof and a low wall, and the manure itself composted or stored in the prescribed manner. It is a measure which will almost certainly be welcomed by the ryots so that their willing co-operation will be forthcoming. Agricultural facilities claim overshadowing importance in the villages and even if the village surroundings should be transformed by magic into a lovely pleasure garden one may still grouse that the village has been deprived of its dumping ground for refuse and manure; they will not have the gardens at the cost of their manure pits !

The Provision of Drinking Water Wells

The commonest need of most villages is the provision of drinking water. Probably there is no village in the Mysore State, it may be stated without exaggeration, in which there are drinking water wells with sufficient wholesome potable water, at a reasonable depth and situated within the village itself and not far away. The condition is pitiable in many villages and very pathetic scenes may be witnessed in the way in which people try to secure their daily supply of water. A well of sorts may be situated a mile or two out in the bed of a far off tank, and one will see the menfolk trudging along morning and evening, with a couple of pots slung from a pole across their shoulder and fetching the precious supply. Inside the village itself, a single well may be all that there is, the water may be 50 or more feet below and even then so scanty that women will have to wait an hour or more before the needs of the early

comers are satisfied and their own turn arrives. Wordy warfare is quite a feature at this scramble and the collection of pots of all shapes and sizes at the wells is quite a sight! In some villages ponds of dirty water or the so-called step wells supply the water, but as the supply is mainly derived from the surface flow of rain water and the people do not scruple to wash in this water, the danger of water-borne diseases is very serious. As a matter of fact in many of these villages the guinea worm disease is widely prevalent and used to be rampant, until suitable sanitary and medical arrangements made in recent years have reduced the incidence very materially. Even where there are large irrigation tanks or a network of canals with plenty of water and even in villages situated on the banks of rivers the supply is available only in the rainy and flood season, and during other parts of the year they have to depend only on wells, which are generally of the same type as in the bulk of the villages described. Almost the very first item of village improvement therefore is a satisfactory drinking water supply, which will be both ample and well protected. For the majority of the villages this will have to be done only through good wells, either fitted with deep well pumps or if they are open wells and the water is within a short depth, provided with one or more pulleys for drawing water. The point hardly needs to be stressed further. Modern well sinking appliances have made the solution of the problem much easier than before and this is a mercy. A small but much needed amenity to be provided in many cases is some sort of roof all around the common wells, so that people especially women, who resort to them may have some shelter from sun and rain; though the inconvenience is great, at present no one takes any notice and curiously enough it is borne uncomplainingly.

Further, a separate well should always be provided for the so-called depressed classes people, so that they need not depend upon the well used by the upper caste people. I should not be understood to perpetuate any caste exclusiveness, when I make this suggestion, but am only providing

for a primary need for this section of the village population in a dependable manner, because old prejudices die hard, and the relics of old time custom, when they were not allowed to draw water from the common well, were subjected to great hardship and had to wait upon the goodwill and convenience of the upper castes, may linger here and there. Matters have greatly improved in recent years, and the younger generation is practically oblivious of such customs, but still one has to take a realistic view and provide for exceptional conditions also, especially in such an important matter as the drinking water supply.

The provision of drinking water wells has always formed an important line of village improvement work and to show progress therein has formed a legitimate ambition with the officers in charge of the work. Absurdities, ludicrous in the extreme, have happened sometimes in these campaigns, which I may recall if only to illustrate the absolutely wooden or mechanical way in which officialdom does things sometimes. In some cases, wells are dug, parapet walls erected, pulley hoists fitted and even the stone slab with the name or date engraved on it was fixed, but it was a well only in name, because it contained no water. The requisite depth was not reached because the money allotted was not enough, and work exactly within the grant was executed. Wags suggested that "Hic jacet" should be added in front of the name, and the whole matter used to be a joke of which they were never tired. Even to-day one hears complaints of "incomplete" wells, left as such for want of necessary funds which will have to be budgeted for and sanction obtained ! Some degree of elasticity in the rules by which engineers in charge may be empowered to incur sufficient expenditure for completing the work without previous sanction and other formalities, or any other procedure which will guarantee the completion, is greatly to be desired.

III. DISEASE CONTROL AND PUBLIC HEALTH

Side by side with these measures of sanitation in and around the villages, measures of direct disease control, both preventive and curative, have naturally formed an important part of village improvement schemes. Luckily in matters of personal cleanliness, our people are generally keen more or less according to their own ideas. Daily baths, frequent washing of the hands and feet, the rinsing of the mouth after every meal, the cleaning of the teeth the first thing in the morning like a religious ritual, the washing and cleaning of all utensils, eating plates and cups so that they look like polished mirrors, the boiling of milk before it is made use of, the daily sweeping and washing of the floors with cow dung paste, red ochre or charcoal mixed with suitable adhesives, the decoration of the floors and of the house front in the street with clever and beautiful drawings in white or coloured powders and pastes, of many a complex geometrical pattern and floral, arabesque, borders and skilfully drawn centre pieces which afford a sense of pride to the womenfolk in the beauty and cleanliness of their houses and many other among the variety of practices of local interest are all well known features in the observance of cleanliness of the home and of the person. It is sometimes considered an obnoxious practice to use cowdung paste for washing floors but no one who has seen a house floor or a threshing floor out in the open after this ritual can think of a better substitute. The material itself which teems with divers bacterial flora is considered as inimical to certain pathogenic bacteria, and it may be doubtful wisdom to condemn the practice, hoary as it is, and with this modern sanction which may be true.

Malaria control and spraying insecticides.—It is to the eradication of insect-transmitted, and water-transmitted diseases, not to speak of soil-borne diseases of fæcal origin

that control measures have related, as a continuous campaign and to outbreaks of plague or cholera, as they appear. No amount of concern, zeal and enthusiasm in the tackling of these diseases has lacked in the past, but little could be achieved of a tangible and permanent nature. The progress of knowledge, the coming in of new techniques and side by side with them the plentiful supply of funds during the last few years have altered the picture completely, The spraying of D.D.T., Paris green, or kerosine emulsion in pools, puddles and the margins of streams and wherever else mosquitoes may breed has had a truly wonderful effect, in eradicating the mosquito pest and with it the dreaded scourge, malaria. It is stated that tracts have been so thoroughly cleaned up that mosquitoes can scarcely be seen. Places in which sleeping without the protection of mosquito curtains was unthinkable have become so free of mosquitoes that curtains are no longer required. I am speaking from the experience of a recent visit of mine to a malnad town when I was surprised to see that even the Head of the district had no mosquito curtains in his house and I myself slept without one—a state of affairs unknown before these spraying campaigns. It is altogether a very fine record of achievement for the various 'Health Units' which have been operating in these centres during the last few years.

It is possible that the consummation most devoutly to be wished for in this as in other matters, *viz*., the taking up of the work by the people themselves as a regular practice in the villages, may come about also, because in the malnad at any rate, people are quite familiar with spraying and spraying outfits, as the spraying against the *Kole roga* of arecanuts and against the leaf disease in coffee is a regular practice and hundreds of sprayers are in use. To make use of the apparatus for spraying D.D.T. is a very easy switch over, especially as they have seen the marvellous mosquito control effect themselves. Even in other parts of the country, thanks to the new insecticide Gammexane, which has become a sort of panacea against most plant pests and the spraying

of which is becoming increasingly popular, a familiarity with spraying and spraying machines is growing in the villages. Readers of Brayne's well-known books like " Socrates in an Indian Village" and the like, will remember that he counsels the peasant to sell the silver bangles of his children and invest the proceeds in mosquito curtains. We may vary the counsel and advice the purchase of a spraying outfit and D.D.T. instead!

I do not think that under present village conditions there is any room for fear that D.D.T. may kill beneficial insects or other animal life, against which we are sometimes warned by American writers; but I came across this most astonishing objection to its use, *viz.*, that it went against the doctrine of " *ahimsa* " to kill mosquitoes! This was revealed at Mathurai to a student from an American University out to study the progress of all this welfare work in India. It is of a piece with the practice said to be usual in some pinjrapoles of hiring a man to spend a night in a room alive with bed bugs, fleas and ants so that the latter may have one day of feasting, and of the sight sometimes to be seen of people trying assiduously to feed ants by sprinkling rice or ragi flour near ant holes. India still remains picturesque if unpredictable, and one lives and learns. Still in a matter like this, there is no need, I think, to reckon with such extreme forms of the ' *ahimsa* ' creed.

The old 'acharas' and rules of cleanliness

Unfortunately old ' *acharas* ' or hoary customs and observances many of which have the sanction of modern science behind them are going out and are being replaced by so-called civilised or fashionable habits of questionable value. They are being taken up by townsfolk and the English-educated classes but are sure to filter down and be copied by the villagers. There is the habit of early coffee or bed tea, taken before the customary cleaning of the teeth and washing of the face, which is becoming very common. There are the coffee hotels which are so ubiquitous that even

villages now possess them, where a few cups or tumblers serve the needs of a large number of people, from which the coffee is sipped but which are seldom washed clean or, if washed at all, are done so in water in which dozens of them have been washed. One is reminded of a greasy dust-covered cyclist who went into a roadside tea house, washed his face in the basin provided but saw that the towel was too dirty for words, complained and asked for a fresh one, to which the landlady replied that it had been used by dozens of customers uncomplainingly and that he was not half so dirty as any of them ! Even in the high class clubs where we dine now-a-days, English fashion, the cleanliness of the plates as they are changed after each course leaves much to be desired. I generally stuck to one plate throughout the dinner but that was not *à la mode* and generally attracted pitying notice. Many of the old rules were ridiculously punctilious but they tended to act as a deterrent to the spread of disease, and promoted a "*mens sana in corpore sano*". The old rules have lost their binding force and fashion is doing the rest. Fashions advance irresistably and one can only hope that they will work themselves out. We may usefully remind ourselves that the fashionable Western customs which we are imitating are now getting discredited in those countries and have already given place to customs much like our own old ones. For example both children and adults are taught to clean their teeth three times a day, whereas not many years ago their teeth knew no cleaning except at the hands of the dentist, who often had to plug his nose while doing it, as one of them told me when I was in the U.S.A. The tooth brush and paste trade is now of enormous magnitude. Baths are frequent and the shower type is being preferred to the splashing type; new napkins and towels in bath rooms and even new cakes of soap are supplied to every new visitor, and even to the same visitor as often as he may visit the room. Separate wash basins are provided for purposes of washing the face and hands, and for cleaning the teeth and spitting into.

Plates at table are brought in scrupulously clean and sterilised and almost too hot to touch. Eating fruit by biting off pieces and thereby making the hands wet with saliva, is also being given up and our method attempted. I may perhaps relate some funny attempts which I have witnessed, in this connection. During a prayer gathering in a college in South India, to which the Principal, an Englishman, was invited, plantains were distributed at the close of the function, and every one was eating them in the way usual with us. This appeared strange to the Principal, who asked if that was the way in which it should be eaten. When told it was so, he said he could not perform such a feat for his life. Urged however to try, he peeled the fruit, broke off a piece, held it in front in line with his open mouth with great precision, and shot it into his mouth, as he thought, but really the piece flew past his head over his shoulder and landed on the floor behind. He became red in the face and seriously confessed that it was too clever a feat and that he should practise it! When in England, and at dinners when we had apples for dessert, I always cut mine into small slices, peeled them and then 'shot' them into my mouth, while my English friends ate them by biting off mouthfuls remarking that I was no doubt considering them barbarians, eating fruit like monkeys. Of course it was just joking but there was an undercurrent of some uneasiness or self-accusation over it all, which was unmistakable. While thus with the efflux of time, the effect of contacts and the progress of knowledge many of the changes I have described are coming over there, we are doing just the opposite, so that as fashions and so-called enlightenment come in through one door, much old world wisdom is going out through another. This digression will perhaps serve to drive an obvious moral home.

The direct control of diseases by preventive and curative treatment will and can always remain the sphere of action by medical officers unlike the measures we have dealt with where a taking over by the people may be expected. Even in respect of direct control of diseases the co-operation

of the villagers in reporting outbreaks promptly, in submitting willingly to inoculations, disinfections, treatment of domestic well water and so forth, or to restrictive measures like segregation, restriction of movements, etc., will have to be forthcoming. In addition, this is a sphere in which there is much scope for the inflow of benefactions, like the building of dispensaries, maternity hospitals, endowment of beds and so on, of which there has been very great evidence in recent years, much to the credit of well-to-do village residents. These will go a long way in removing the disabilities of village life, which at present stand in the way of people settling permanently in villages.

IV. VILLAGE ROADS

One of the first activities in rural improvement which has been taken up from the very beginning is the opening of roads connecting the villages with the main highway wherever practicable, but more especially connecting villages with one another. Very great enthusiasm prevailed in those days and officers in charge of the work vied with each other in showing progress within their respective jurisdiction. There was a system (to which more reference will be made later on) under which villagers were to contribute one day's free labour each week for work of a communal character and this obligation was to a great extent utilised for this purpose. In the beginning at least the labour was willingly and gladly given and it was hardly felt irksome, so that very great progress was possible. It happens also that the same enthusiasm and activity forms a prominent feature of the present-day Community projects and Extension services and that hundreds of miles of road have been constructed through such labour in certain States, notably the U.P.

It may be useful to emphasise certain aspects of this line of activity, especially as the lesson of the past, so that the improvement achieved may be real and permanent. The first is the need for technical advice in the alignment of the roads. Usually they follow old cart tracks or even foot paths, which keep changing their course with the deterioration of the surface by erosion or growth of scrub vegetation and which are often needlessly roundabout so as to avoid rock-strewn, eroded and similar difficult terrain, or they may be too steep for cart traffic but favoured as a foot path on account of the saving in the distance. Some better and more permanent work has to be attempted for which facilities like a proper alignment and also the acquiring of the necessary strip of land where it should be private property, should be forthcoming. The latter will indeed be found no easy matter

and something in the nature of compulsory acquisition will have to be resorted to, with the risk of arousing opposition and unpopularity.

Secondly, and probably the more important aspect, is the need for protecting the surface both by periodical effective repairs, and by the construction of culverts or cause-ways where streamlets or valley bottoms have to be crossed. The lack of provision for these, either because funds were lacking or because the villagers' enthusiasm could not be kept up at the initial level in the succeeding years, has virtually led to a waste of effort and the roads in many cases seriously deteriorated and reverted to their original condition, sometimes hardly leaving a trace. Such a contingency is real and may recur even under the present conditions of a more efficient organisation and this danger will have to be guarded against. It is a peculiar weakness among villagers, others perhaps are not free either, that if they should come across even a petty road block such as a slight scour, a slab of stone or a clump of shrubs, they will not remove or set it right but will simply take a slight detour and avoid it. This attitude will have to be reckoned with and a permanent supervising agency conducting the periodical repairs will have to attend to them in time and not allow them to grow worse. As a matter of fact after the roads have been made by the voluntary labour of the villagers it will have to be taken over and managed like any Government road.

A very important accessory to these village roads, more especially in the malnad taluks, is the provision of bridges across the streams, which in this tract have very steep sides and in the rainy season are raging torrents, the crossing of which is dangerous. The countryside is cut up by these narrow and steep gorges and contribute in no small measure to the bottling up of these villages in the rainy season. Even villages which are within easy hailing distance from one another but situated on opposite banks of such streams are isolated from each other as effectively as if they were miles apart. Not many years ago the situation was said to be so

serious that the malnad was a dreaded country in the rains. Things have vastly improved and the tract has been opened up and roads and bridges provided in recent years, but large sections still remain untouched and the hardship due to the isolation continues. Small bridges of suitable design will have to be put up to serve this tract and there is much scope for the exercise of engineering talent in designing cheap yet permanent structures. At one time the wooden structures designed by the late Dr. S. Kamesam were thought of for this purpose and a few were constructed; other designs are of course possible and the matter deserves to be pursued for speedy practical action. In many cases even narrow bridges fit only for pedestrian traffic, though not for carts, will afford very material relief.

Clearing of rank vegetation.—The clearing of rank and noxious vegetation especially lantana, prickly pear, touch-me-not and other thorny shrubs round the villages used to be a common item in the village improvement programme. Such vegetation harboured snakes and other reptiles, furnished good cover to cheetahs and tigers in the tracts which were the haunts of such beasts, they bred mosquitoes, they usurped much valuable cultivable land, were an impediment to the free movement of men and cattle, and in the tracts of heavy rainfall they simply overran the village and, if not cut down and removed, they grew so rapidly that it was a case of 'letting in the jungle'. The trouble was that no one considered it his business to cut them down, except when it was a case of dire need and the vegetation was too near to his dwelling; the growth on the common land was left untouched and had to be tackled by special measures when it became serious. Co-operative societies for their eradication were formed in some places, special rewards and other inducement were offered, and elsewhere the work was included in the common village welfare work to be attended to on the free labour days of the village improvement schemes. Much was done and one at least, *viz.*, the prickly pear has gone out of the picture altogether, thanks to the so-called

biological control of the pest by the cochineal insect, which worked like magic and cost no labour or attention on the part of the villagers. That is the kind of control or eradication which they welcome, and naturally too, and one wishes that all noxious vegetation were amenable to a similar treatment. Perhaps dusts and sprays with the weed-killing hormones like the 2–4D may be effective, in which case the problem is simplified. At present however joint labour and elbow grease alone will work and these will have to be forthcoming. In the malnad villages especially the need for this item of improvement continues unabated and the lantana and the touch-me-not (*Mimosa pudica*) are working havoc. Their destruction by one or more of the above methods will have to be attended to as part of the Community project or Extension programmes.

The filling in of pits.—The filling in of pits both in the open places around the village, on the village road, and even in the street, which constitute a menace to people going about at night besides adding to the general insanitary condition of the village used to be prescribed as work to be carried out by communal labour in the same way as the making of roads, cutting down and removal of noxious vegetation and so forth, referred to above. These pits usually become the receptacle of the surface flow of water in the rains, and with algal and moss growth covering the surface like a slime, are a fertile source of mosquitoes. Sometimes they are of considerable size and form village ponds, the water from which, dirty enough in all conscience, is used by the people for washing purposes (and for no other purpose, one hopes). These large ones therefore serve some useful purpose and in any case will be found too large for any filling up. They can be tackled only in order to make them less dangerous to public health, by the special measures of spraying with D.D.T., Paris green, and such insecticides, and by the frequent removal of algal and other aquatic vegetation, for which the weed killing hormone 2–4D can also be tried. The smaller pits can of course be easily managed and filled

up. The spraying programme will, however, have to be repeated, and in this, as in many other measures of village improvement, there must be an efficient and responsible agency which will carry out the work regularly, with the co-operation of the villagers preferably or with paid labour if necessary. Many duties are imposed upon village Panchayats and however perfunctory or negligent they may be, it will be found that as a permanent institution no other agency is thinkable. It need only be added that the custom common in the cities and towns of utilising town wastes, sweepings and manure for filling pits, ponds or breached tanks cannot be condemned too strongly. It is a diversion of the material from its legitimate use for increasing crop production to become uncertain foundations for human habitations.

Land levelling.—In a highly undulating country like Mysore and in many other parts of India as well, fields lie on sloping ground sometimes too sloping to manage cultivation with ease. Erosion, much surface flow of rain water, washing off of fine fertile soil with the bringing up or exposure of gravelly earth, difficulty in ploughing and a low level of fertility are the result, despite painstaking cultivation. In many villages the evil is serious, and although a certain amount of levelling is attempted and efficient bunds thrown across the line of flow at the bottom of the fields, the result still leaves much to be desired, and farmers would greatly appreciate efficient methods and help in bringing the fields into a level or less sloping condition. The use of bull dozers which are now coming into use for this and similar purposes will be greatly welcomed, and this is a line of action which should be taken up, if possible, by the Project or Extension authorities. Farmers would gladly pay such charges as may be levied in part or even in full if they are not very high. Village surveys will reveal the scope for this work, and as a measure of permanent improvement it should figure prominently in the programme. Erosion control, along with the reduction in slope, can also be combined with the

improvement of the water supply to tanks, and both can be simultaneously accomplished, if regular channels are cut along the contours, which will lead into the tanks, so that all surface wash may be controlled and harnessed at the same time and made to flow into and increase the supply in the tank. Contour bunding, cross drains, and such methods should thus not only reduce and control the surface flow, but should be designed to lead out surplus flow, without damage to the surface, if not with definite advantage as above.

Moreover as the fields are distributed at present, it is very inconvenient and almost impossible to cart manure, new earth, sand, tank silt, etc., to many fields without having to pass through other's fields. In some villages, especially in the black cotton soil tracts, narrow field roads or tracks like lanes called "*Onees*" exist, which reduce this difficulty to some extent. It will be well if the provision of such approach roads which will afford access to fields is kept in mind and carried out to the extent possible as part of the levelling, or of the village to village roads programme. Unfortunately, despite the great convenience that will accrue, farmers will not agree to have their fields cut up or to surrender the necessary strip of land for even a narrow lane or cart track, but it should be attempted nevertheless, for even a little may mean material relief.

V. RURAL EDUCATION

Education with a view to removing illiteracy and furnishing a key to the door of knowledge, and at a higher level for securing the benefits of material advancement which higher education, both general and technical, leads to bulks very largely in all programmes of economic development. It has done so in the past and continues to do so at present. It is certainly in this field, it must be said, that the most remarkable progress has been achieved, and if one reviews it during the last quarter of a century, it will be difficult to speak about it except in superlatives. There is hardly a village of any importance which has not at least one primary school; villages where there was not even a primary school now have secondary schools, and where there were only secondary schools there are now high schools, and colleges both intermediate and first grade have increased in proportion to cope with the flood. Technical colleges and schools of high repute, University and post-graduate education of a very advanced type have attained great popularity and an all-India name. If growth goes on at this rate, and it is possible that it may be speedier, many difficult problems, notably that of buildings and equipment, will have to be faced which may defy the best brains in the country and strain the financial resources to breaking point. The Mysore Government's provision for expenditure under ' Education ' for the year 1954–55, is the huge figure of Rs. 418 lakhs, said to represent roughly one-third of the revenues of the State.

One of the special features of this progress is the importtant part which the people have taken in it, as distinguished from Government initiative. It may not be too much to say that the people have been driving the Government. Not a little of the activity is due to the so-called backward communities. Their awakening has been phenomenal, and it will be a misnomer to call them by this name any longer, although

they themselves do not disdain to dub themselves as such. The stalwarts of the movement really did yeoman's service in this field. In the encouragement given to education, many castes and communities of this class have vied with each other, providing hostels, free boarding and such aids to the boys of their own respective communities, and the scholarships instituted by Government exclusively for these communities have been so liberal that an outsider once characterised it as all prizes and no blanks; they have of course given a big push to this progress. It is also equally remarkable that girls' education too has shared in this progress. Moreover the whole educational system has constantly come under review; many committees and conferences have sat and changes have been introduced in various directions to improve the system, to alter the pattern to suit changing conditions and make it more efficient generally. Even now such examination continues and momentous changes are in the offing which may well prove a revolutionary upheaval causing a breakaway from the past in respect of the language of education.

Adult education.—All these are in the main on the provincial, district and taluk level and the people benefited are those who seek education because it leads to material advancement, and it needs no stimulus of any kind any longer. The scope lies more at the village level, and among the people who are too old to start schooling or who are satisfied with their lot and feel no urge to seek service and the material benefits which school education leads to. In addition to this class of people the villages, and for that matter even the towns and cities, abound in people who in spite of a certain amount of schooling which they may have received and have learnt at least to read and write, find no use for such attainment and never open a book or a paper, the key to the door of knowledge merely rusting unused, and who are referred to as the 'wastage' in education. At the village level therefore not to speak of the town dwellers of this kind of adults, steps have to be taken or intensified where work

has already been initiated for what is generally called adult education. In the past efforts were directed more towards the removal of illiteracy; and night schools were started and even itinerant teachers were appointed, because life was too short, it was said, if one had to wait for regular schools with buildings, staff, etc. Little was achieved and both became a subject of ridicule. They were more or less show affairs and aroused little interest. I remember being taken to a night school in a village where I was camping one night and saw the absurd sight of one solitary villager turning up after a lot of waiting, sitting in front of the little potshard lamp provided, opening his book and trying to spell out *ādu* (sheep), *āne* (elephant), etc., much to his own merriment, I thought. The itinerant teachers on the other hand held weekly classes, and the six non-working days afforded ample time for the adult or youthful learner, all too busy with their daily labours, to forget what they had learnt to read or write in the previous visit. These well-meant but fruitless efforts have now long been forgotten but the moral they convey should inspire better methods and more sustained work, now that the campaign of adult education has been restarted, and that is the reason for my recounting these old happenings. Adult education in the present set-up has, it must be noted with pleasure, aroused great enthusiasm among young college students and has stirred them to go out in batches to the villages and help the movement during their vacation, thus providing a fruitful outlet for their ardour for social service. One hopes that this initial enthusiam may not wane, as it has been the case in a number of other good movements and that it may not be looked upon as a festival performance but with a sense of serious and sustained responsibility which the task demands.

The lack of interest in the people concerned despite all this benevolent aid from many sides has led to the view sometimes expressed that it amounts to a waste of effort to lead these unwilling horses to water, for they will not drink; that even in Western countries the ordinary working class

man, though he has passed through a school, seldom makes any use of his schooling, except to look into a paper for the sporting news, or to read a penny thriller, and never thinks of the Pierian spring at which one fondly believed that he drinks or will drink. If the objective should be to afford knowledge and enlightenment and not this unwanted and unused gift of literacy, it may be well to look to the radio and cinema film as indeed to the traditional methods of puranic readings or the modern '*harikathas*', as a better and more fruitful channel. One however has to be careful with the latter, lest sectarian susceptibilities are wounded. The appeal to the eye, the heart and the mind is both immediate and lasting, and there is practically no limit to the variety of subjects which could be dealt with, secular, religious or moral. The method is coming into use no doubt in the new campaign, and one only emphasises a speeding up and an extension of the area covered.

The problem however should soon cease to exist, because the rising generation even at the lowest social levels is not only fully literate but is also educated moderately well, thanks to the spread of elementary education everywhere, and will before long take the place of the present age-group of illiterate adults.

The old rural education campaign also comprised a scheme of travelling rural libraries; suitable books were selected, were packed in attractive book cases and were sent round in circulation according to a circuit prescribed for each set. This was of course intended to create a taste for reading among the villagers and as a stimulus for adults to follow up their early schooling. It has gone the way of many such good things, the books have long ceased to travel, and have probably come to rest in some school library!

Agriculture and Rural Education

The subject of agricultural education has naturally to take an important place in the schemes of economic development, as agriculture forms the main occupation of the people

and as agriculture has been given the top priority that it demands in the programme of rural improvement. This has been fully recognised even in the past, and much attention has been bestowed on the nature of the instruction to be given and the appropriate institutions therefor. Agricultural colleges at the highest level leading to a University degree, diploma courses of a lesser order, both of course in the English language, and intended for those who have already entered the University, or finished high school education, respectively, and agricultural schools imparting instruction in the vernacular languages which will meet the requirements of the actual farming classes, have all been more or less longstanding institutions in most of the States. In addition to these colleges and schools, devoted solely to agriculture, in Mysore at least, agriculture has formed a part of the ordinary general education, with graduated courses and suitable text-books and even facilities for practical work in the field or garden in many cases, for several years now. So that provision has been made for agricultural education at different levels and generally adequate to the demand, if not to what may be deemed the needs of the country.

It is unfortunate however that agricultural education is far from popular. Neither the colleges nor the schools attract students, the pick of them apply to the other professional institutions and agriculture is chosen only as a last resort when admission to the other colleges cannot be had. Really first class students are a rarity, and when some years ago one did stray in, I remember he was looked upon as a precious museum specimen and as a show boy. Parents recommending their sons may be heard saying that their best sons had already secured admission to the college of medicine or engineering, but that this one was not so good—euphemism for a bit of a dunce—but would do very well for agriculture. The naivete with which the recommendation is made in these terms with absolutely no thought of the low estimation it implies of agricultural education is really sad, but it reflects the general feeling, and even Dr. Voelcker

who reported on Indian agriculture some 60 years ago mentions it. The reason is, firstly, the fact that when all is said and done agriculture as a profession is looked down upon notwithstanding the lyrical praises of the husbandman and his rôle as the producer of the sustenance of mankind, and this feeling is reflected in people's attitude towards agricultural education.

Secondly, a degree or diploma in agriculture leads to no attractive Government job, which forms the undoubted goal of all education in this country, however much one may deplore it. India is not peculiar in this respect, one may note, if that is any consolation. Applications to these colleges and schools are in direct proportion to the prospects of appointments and now that the chances of employment are increasing very much, there is a correspondingly great increase in the numbers seeking admission, although the difficulty of getting admission anywhere at all has also some bearing. Even the vernacular agricultural schools suffer from the same handicap, the ryots do not feel the need for any such schools for instruction in what they think they already know, unless of course it leads to a job at the end of the course. The fond hope that college trained young men will take to farming as a profession either on their own land or as employees under large landowners or in plantations has nowhere been realised, although there have been some notable exceptions, here and there. It may be added that this applies not only to the students belonging to the non-cultivating classes but also to those belonging to the cultivating classes.

Agriculture as part of general education.—The inclusion of agriculture in the syllabus of studies in the general education schools is the next method and boys have to study the subject just like any other subject; these schools are therefore not like the agricultural schools proper, which as we have seen are so thoroughly cold-shouldered. It is a case of Mahomet going to the mountain because the mountain will not go to him. The method has the merit of spreading

agricultural education over a wide area and with the variants like nature study, school gardens, field excursions, etc., it can permeate practically every village. A syllabus of a graduated kind suitable for the Lower Secondary and even High schools in selected areas will lead to a fairly good standard of agricultural knowledge among a moderately good section of the young student population and if such schools are at all numerous, it will mean that all important rural regions are served.

Here too we meet with the obstacle that neither teacher nor student bestows the same attention on this subject as they do on the other subjects and treat it much as an untouchable. This has had to be got over by making it an examination subject, with which they cannot trifle. Even where this element of what may be regarded as compulsion is not resorted to, the subject may be made really attractive to the youngsters, perhaps even more than the other subjects, if the teaching is of the proper kind. For one thing, the subject deals with the objects and sights which they see and perhaps handle everyday. Such familiarity alone is a factor in drawing and keeping their interest and attention. These boys are remarkably observant and will be found to possess already a surprisingly good fund of knowledge of the things around them; they can spot a jaggery boiling house or an areca garden, for instance, a long distance off by the smell of the boiling syrup or the perfume of the flowers. They know about the ways of cats, dogs and sheep and the common birds and will even put you wise as to how a calf comes into the world! Many an interesting experiment showing the reaction of plant life from seed to seed, to factors like the atmosphere, warmth, water and light or illustrating the properties of soils, such as how they take up and retain moisture, or react to litmus, how highly turbid water can be cleared with a little lime water, the study of the life-cycle of a valuable insect like the silkworm, how an insecticide like D.D.T. or Gammexane kills out pests, and many similar facts, should open the eye of the students to

the wonders around them and should make the lessons something to be looked forward to rather than be hated or shunned. Taught in connection with agriculture, even arithmetic, the bug-bear of most children, can be made both interesting and highly conducive to efficient instruction. Youngsters may be made to handle a foot rule, and a measuring tape, to measure lengths and breadths and distances, calculate areas, handle a pair of weighing scales and weights, and measuring vessels, made to weigh or measure and calculate quantities required for specific areas at particular seed rates, measure the dimensions of rooms, find the cubical contents, or the floor areas, measure or weigh various grains and pulses, calculate yield per acre and so on, in a dozen ways— in all of which they will handle real things and feel they are dealing with realities and not mere words. Such a process produces a lasting effect in the pupil's mind and forms a better preparation for higher studies, whatever they may be apart from agriculture. In an elementary text-book on agriculture for village schools which I had to write and publish, I have emphasised this method, which I have reason to believe has been found useful.

A farm, however small, should form an invariable adjunct to village schools, which besides serving the needs of the school, can be made useful to the villagers themselves. A few new crops can be grown including green manure crops, some of the common crops of the villages may be manured with artificial manures, the value of pure seed, of heavy seed, the selection of choice earheads in the field, etc., and many such small demonstrations can be conducted, which though primarily intended for the pupils will be found useful to the villagers also, who should be invited to visit the school lands and have their attention drawn to these demonstrations. I have even heard that parents listening to their son's reading of their agricultural lessons have had their interest aroused, to their own surprise, and made them feel that after all their children were not reading mere useless book stuff but something that was worth knowing.

Recently there has been a tendency to include some lessons of Animal Husbandry, like the keeping of poultry, the rearing of sheep and of calves, etc., in these village schools. It is all to the good, and, even if nothing else, it serves to rub off the fear or disinclination of the youngsters to handle them and also otherwise to make them feel that agriculture is not all crop-raising as is the general impression. The new breeds which may be brought into the villages, the new kinds of feeds which may be introduced, a knowledge of the importance of the sire and of the care to be bestowed on the calf, all these may further prove both useful and instructive to the villagers and make them take more interest in these schools. As a matter of fact, by organising competitions and prize awards for well-bred calves, sheep or a high egg laying performance in hens, among the pupils of the school, the direct co-operation of the parents themselves is also enlisted in this kind of activity. An increase in the number of such schools together with steps to improve their efficiency may be strongly emphasised therefore in the programme of rural agricultural education.

Agricultural colleges and schools.—As regards the pure agricultural institutions whether of the high University degree or diploma type or of the vernacular agricultural schools of a lower type, but more accessible to village boys or adults, it may be desirable to examine their present condition, the facilities they provide for scientific and practical work, the length of the courses, the syllabus, and their efficiency in general as judged by their capacity not only to promote scientific research but also to popularise and spread the results of such research, the need if any to widen their scope or increase their number, the ways and means of employing the trained men in appropriate jobs, to afford such aids and concessions as may be necessary to induce them to take to farming as a profession and kindred matters. This is a practice which already exists in the University of Bombay where a commission is appointed for the purpose once in three years, but its scope is very limited and confined

moreover only to the Agricultural College in Poona and does not extend to the lower type of institutions. Whether such a system exists in other Universities I do not know. In any case a commission either of a regional type dealing with each State or of wider application and covering institutions of all grades from the top to the bottom, has not been thought of so far and is really long over due. Now that under the new circumstances large and important agricultural developments are to take place, the appointment of such a commission and the conduct of such an inquiry would appear very desirable and urgent, whether it is to be of an all-India scope or confined to any particular State.

Along with the other matters already outlined above, the question whether the syllabus of the Extension Training Centres cannot be added to that of the colleges (or vernacular agricultural schools, with necessary modifications) may be advantageously considered. The present Training Centres appear to be only of an *ad hoc* type, but the training is so important and so necessary in the Extension service and Community projects both now and in the future, that it will be well to make it permanent, which can be effected both usefully and economically if it is combined with the syllabus of the colleges and schools of agriculture. Matters like confining it to those who specialise in agriculture as distinct from the sciences or making it open to all, as a six months additional course, whether men already in service can be admitted so as to undergo the training as a kind of refresher course and the methods of adapting the training to the lower standard of the vernacular agricultural schools, the men trained in which may be useful as village workers permanently resident in the villages, and similar ones will have to be considered also. The result of such a combination will be that very large numbers can be trained and under conditions where all the facilities already exist, such as farms, laboratories and all other kinds of equipment.

VI. RURAL INDUSTRIES AND SPARE TIME OCCUPATIONS

Side by side with the increasing of the crop yields, which brings about substantial prosperity to practically every one in the villages, there is need for affording to a good many of them some profitable spare time employment and enabling them to earn a higher money income. Variously called cottage industries, subsidiary occupations, spare time employment and so on, this matter has received attention from the very beginning and has figured largely in schemes of rural development, but like many others of the same kind has not yielded even a fraction of the result expected, although survivals of the early attempts may be seen here and there. It is not as if there are inherent defects in the people which preclude the growth of any such industries, because there are instances where the matter has been taken up by private capitalists and traders and has resulted in phenomenal development. The development of the "beedi" making industry is comparatively new, and yet it has become a cottage industry of the first magnitude, with even the evil consequences which follow in the wake of such industries such as sweated labour, child labour, etc. The match and pyrotechnical industry in South India is another instance of such phenomenal growth, and somewhat similar to it though on a smaller scale is the incense stick making and perfumery trade. Even the humble broom making industry has grown in recent years in the cocoanut and palmyra palm tracts both in Mysore and South India, thanks to the stimulus of a brisk outside demand, so much so that many a poor family has been enabled to add materially to its income. The development of the handloom weaving industry to such an extent that the Madras Registrar of Co-operative Societies has remarked that it is to be regarded 'more as a warning than as a matter for satisfaction' is another instance

where capitalists have taken a hand and produced a record which all Government efforts in this matter combined could not have even approached. These are mentioned to show that the elements of success as far as the people are concerned are there and that the causes for the poor results achieved or the failures (to put it bluntly) of well-meant Government efforts have to be sought for in the methods peculiar to Government action, and the lack of the personal interest and sustained effort characteristic of individual private ventures. Though it will be hardly appropriate to go into this subject in detail (even if I should consider myself competent and presume to do so), still a few general observations may not be deemed out of place.

The scope or need for industries in villages of different types.—It is not generally recognised that the agriculturist is busy throughout the year and in some seasons very busy indeed, and hard pressed for time; he is by no means burdened with a lot of spare time which he does not know what to do with and for which some useful occupation should be found, if he is not to fall into the hands of the evil one who is said to 'find some mischief still for idle hands to do'. In villages where both irrigated and dry cultivation are carried on and the irrigation tank has always a good supply of water, the ryot's time is fully occupied. At the close of the year come the harvesting and stacking of the dry crops (ragi) which is followed by the harvesting and threshing of the rainy season paddy crop, and on its heels follows the threshing of the ragi; then come the harvesting and milling of sugarcane, the ploughing and preparation of the land for the planting of the next crop of sugarcane, and in the interval the raising of the paddy nursery for the hot weather paddy crop; the transplanting of the seedlings in the prepared fields, the continuation of the cane milling, the carting of the crops for marketing them come next, and are followed by the carting of manure for the dryland fields for the next season's crop, the harvesting and threshing of the summer paddy, after which the early rains begin and start a similar

round of operations from ploughing to harvesting. If in addition, garden cultivation is also carried on, then it is an incessant grind, and the ryot and his family will be more than fully occupied, and to snatch a little respite to attend a fair or a festival will be a problem. Labour will be available to the landless section of the village population also in this tread-mill round of duties throughout the year.

It is only in villages where there is no irrigated cultivation or where irrigated cultivation is possible only in the flood season as in the channel tracts, that there is a fairly prolonged slack season and considerable scope for the development of spare time industrial occupations. It follows as a corollary that with the progress of irrigation, as new reservoirs are built, old ones repaired and improved and new wells are sunk in the manner now contemplated and has already taken place in many regions, the scope and need for spare time occupations will become less and less, because cultivation is possible all the year round unlike in Europe and America where in winter nature puts an inexorable stop to all plant growth. Indeed it will be no exaggeration to state that if only some three or four of the deep wells now being located and put down capable of irrigating some 50 acres or so each are provided in these exclusively dry land villages, the problem of spare time employment will practically disappear in such villages. The limitations imposed by all these considerations are not generally recognised and it is necessary to bear them in mind, in the selection of villages or tracts for launching any schemes for these industries.

It is in the exclusively or largely dry farmed villages that the scope and need are very great, for providing the people with these subsidiary occupations. Each family has a larger number of members than can be employed in the cultivation of the family lands or those of absentee landlords, and it is from these villages that the big servant population of the towns and cities derives its continuous addition and it is from here too that the distant coffee and tea plantations derive their labour, both permanent and seasonal or migrant.

Types of industries.—Such non-irrigated tracts being thus the most suitable or at any rate where the need is greatest, and worthy of being selected for any such systematic scheme for introducing subsidiary industries, the question arises as to the type of industries which may be found most desirable. For instance, it may be urged that large-scale industries of one kind or another should be started in the countryside, and a form of scattering or even distribution of industrial concerns should be brought about and that the concentration in and around particular cities should be discouraged or prevented. Such a step will draw away permanently the surplus population from those villages and more or less squeeze them out of their dependence on agriculture as the sole means of subsistence. Incidentally the advantage to the cities will be great; their problem of housing, water supply, drainage and general congestion will be very materially eased. On the other hand it may be also urged that industrial occupations should be provided in the villages themselves preferably in each man's home where both men and women can work in their spare time, which will not necessitate their leaving the village and would greatly contribute to the prosperity of the village itself. These will be of the typical cottage industry type, whose organisation, working and successful management, especially in regard to the sale of the goods, are attended with much difficulty, if past experience is any guide. In between these two extremes may be considered industries utilising the agricultural products of the villages, into some industrial or processed products, which have to be located right in the middle of the countryside, where work is of a seasonal character and for which therefore the bulk of the labour can come from the surrounding villages during the hours of labour, returning to their homes after the knock off.

Since all these three methods can materially contribute to the solution of the problem and there may be scope for one or other of them in particular villages or tracts according to the facilities available there is no need to consider any

of them sacrosanct and as the one exclusively to be favoured in preference to the others. A good survey will reveal possibilities, in accordance with which the actual type will have to be decided. As a matter of fact, several industrial concerns quite new to the country, including even large textile mills have sprung up in recent years in the countryside as distinguished from the cities and suburbs, and all of them promise to increase in number. To the intermediate class belong the numerous rice mills, groundnut decorticators, and ginning factories which stud the country each in its suitable tract of rice, groundnut and cotton respectively, while the sugar factories come in a class by themselves partaking of the character of both. In the villages, flour mills have sprung up in very small units and their number is now so large that they have completely replaced the old time domestic grinding stones and have saved the womenfolk from their age-old drudgery. Of the purely village type and in what may be called the lowest class among these, are several small-scale industries or occupations, which though small individually reach huge proportions in the aggregate. From the humble households and the work of the womenfolk, poor widows and so on come the leaf plates stitched from the leaves of the *Butea frondosa*, the lotus and others, and likewise the drinking cups (*dhonnés*) made out of dry plantain leaves; converging to market in driblets they reach waggonload dimensions when consigned to towns and cities. The South Indian *appalams* or *pappadams*, likewise furnish employment to poor people in hundreds of homes and have an unlimited scope for expansion. To the same category belongs the making of baskets, mats, boxes, both plain and ornamental, out of the leaves and leaf petioles of the palmyra palm in South India, which affords profitable subsidiary employment to hundreds of villages in that part of the country. So is the making of date leaf mats, which is an important packing or baling material for many valuable commodities, such as tobacco, tamarind, chillies and others. The making of mats intended

for sleeping on, used in practically every household, out of sedges and the leaves of the *kedikè* (screw pine, *Pandanus odoratissimus*) and made in their thousands, of both coarse and fine weaves, keeps many families engaged in many parts of the country. The bamboo is really king among the materials for cottage industries; out of which a variety of articles both for ordinary use and indispensable for multifarious purposes are made and which gives employment to a large body of men, women and children. Baskets of all kinds, from delicate ornamental ones to large heavy and strong ones for carrying materials in headloads, and which holds its own despite machinery for earth moving or elevators for hoisting, containers for the transport of fruits by rail, bins for storing produce, cribs for carts, bamboo mats for use as roofing, walls, screens, and dwelling houses, chicks, artistic light furniture, etc.—the variety is most interesting, and if we include the uses to which the unworked bamboo is used as poles, reapers, or cut into sections as containers for liquids, it is really astonishing, and the list is by no means complete. A most important peculiarity of all these small-scale cottage industries we have listed is that they meet a real need, that the market for them is all within the country itself and is practically inexhaustible, and finally that they are flourishing without any aid or stimulus from Government.

The occupational castes.—It should be observed that in the case of many of the village industries which in the aggregate furnish employment to a large population and supply many important and permanent needs of the people, they are in the hands of special classes of people, the class having petrified into an occupational caste whose members do not take to anything other than their caste profession and into which others do not intrude. This feature will militate against any attempt to diffuse any of these occupations among a larger number of people by giving them the necessary training. Carpenters, blacksmiths, weavers, oilmongers, potters, and leatherworkers in the villages, for example, are castes of this type. A curious example of this attitude

on the part of the people has been noted and referred to by a recent tourist in India, who observes that many classes who although they may be large eaters of fish, object for caste reasons to go out and fish, in spite of the fact that in the lakes and lagoons round about fish are abundant and easy to catch, like the cat which the "fish would eat but was loathe to wet her feet!" Still, these rules of exclusiveness are breaking down and where operations are carried out by machinery they have simply ceased to exist. Now that rural electrification is going on apace, the use of small electric motors to drive appropriate small-scale machines seem desirable, so as to increase the output and earnings per man and also to afford relief from physical strain and drudgery.

It is also a lamentable fact that several village industries are languishing or fast disappearing and the respective craftsmen desert the village and some give up their ancestral occupation, either because machinery has come in or because factory-made mass produced articles have ousted their hand-made products. The hand pounding of rice is gone, village ginning and spinning are gone too, the *cumbly* weaver cannot meet the competition of mill made rugs and blankets besides competing for raw wool with the present-day drugget kings, shoes and sandals come from factories and the poor cobbler is left only with the humble patching job, and so on, examples of which can be multiplied and are well known. The villages have been depleted of their time-honoured craftsmen and the making and repairing of ploughs, seed drills and harrows which used to be attended to by the village carpenter and blacksmith has become a difficult matter. Of course in many of these matters the old order is gone past recall and the men concerned have only to adjust themselves to the altered circumstances, as indeed they have done to a large extent. Craftsmen of all kinds have been roped in by contractors and capitalist employers and drawn to the towns and cities and even far-off centres and for skilled work of even the smallest kind the villages have to bring in men from outside. This has added to the drawbacks and

difficulties of village life, and increased the tendency to desert them in favour of the towns; in any schemes of encouraging subsidiary or cottage industries, this fact should be taken note of and some provision made against it.

Cottage industries for fancy goods and artware.—Cottage industries of another kind relate to the production of fancy articles, generally of high artistic workmanship, such as carvings in sandalwood and ivory, inlaid work, woven goods, ornamental metal ware, toys, etc., for which many parts of the country have a centuries-old name and tradition, and the form of encouragement which should be given to them is frequently discussed in this connection. In the nature of things the market for such articles can only be limited but such as it may be, it is capable of development especially as an attraction to foreign tourists and for introduction into foreign markets; equally important with this purely commercial aspect of the matter is the more precious if less tangible need to keep these skills and creative instincts alive and to give them an honoured place in the sphere of fine arts in the country. In view of the special efforts to be made for the convenience and comforts of foreign tourists and as part of the conducted tours, and further of the opening of Indian consulates and trade agencies in foreign countries, with facilities for advertising and sale, a great fillip to these industries may be expected. Although past efforts to rehabilitate them and even to rescue them from virtual extinction have met with only little success still in the present context better results may be reasonably expected. It is within everyone's knowledge that the chief trouble is the irregular demand and the irregular supply, each reacting upon the other to the serious detriment of any steady business in them. One reason is of course the poverty of the workmen who cannot keep up a supply unless the stock is sold rapidly and a money return adequate to their work and expenses accrues promptly. If emporiums and sale depots can buy and pay for the articles at once or better still can advance money, the supply will certainly improve.

New designs or articles of a new type altogether such as may appeal to foreign tourists are also recommended, for which expert advice is necessary. The use of poor or 'cheap jack' material alongside or as part of precious artistic workmanship such as a tack nail or even a boot nail as part of the joinery in an expensive sandalwood carved casket has also been noticed as a fault from which the men have to be weaned. There is also the fact that the demand is mostly for the cheap things like combs, paper cutters, penholders, etc.—a sort of 'pot boilers' as they would say among paintings—and not for the expensive beautifully carved panels, boxes, picture frames, caskets and the like, a feature which by no means adds to the lucrative character of the trade. Unless therefore there is more money to be made in the profession by means of the improvements suggested the craft cannot help falling into decay.

Even without any such expert advice there is a superabundance of designs available in the shape of the inexhaustible wealth of carvings in our famous ancient temples. The numerous images can be copied, replicas of the wonderful friezes and panels can be made as small plaques and picture frames, trays or table tops, whether in expensive sandalwood or in any of the cheaper woods used for the purpose, and these will find a ready sale if stocked in tourist centres and elsewhere.

I have had much to do with the marketing of these sandalwood and other fancy articles (as President of the Mysore Provincial Co-operative Marketing Society) and am painfully aware of these drawbacks and conscious of the need for well organised assistance, financial, technical and commercial, along directions which are more or less well known, if further decay should be arrested. Whatever steps may be taken the crux of the problem will be the marketing which will act as the most important limiting factor in the development.

In a somewhat different and humbler but promising class come the making of simple toys of various kinds, in

clay, wood, soft stone (steatite) rag dolls, paper flowers, festoons, fans, etc., and the dozen other similar articles one sees being vended in and around city markets in the evenings; these afford a lucrative outlet for the labour at home and can find a ready sale even in the weekly *santhés*, almost at one's door so to speak, for the village mothers however poor are devoted to their children and would always like to return home with something for the little ones to amuse themselves with. The '*gramasevikas*' can easily lend a hand in teaching the village women some of these little crafts, in addition to needle work, embroidery and tailoring as a spare-time work. Provided people will learn to think that it is not *infra dig* to work and earn there is always room for everyone to earn a little and add to the family income.

Cottage industries which blend with agriculture

(*a*) *Dairying.*—Important as the revitalisation of these special crafts and small industries is, the road to village prosperity lies in finding and fostering subsidiary occupations for the ordinary agriculturists and the general bulk of the villagers, a matter which has already been referred to briefly. In deciding such occupations it should be noted that the most promising will be such as will blend with the farming profession, and the foremost among them will be dairying. Practically every household can keep a buffalo or a cow without difficulty, and ryots have to do so in any case. These milk animals are a source of every day money income; they are a means of turning to profitable use the by-products of the farm and the waste materials of the household; they provide the farmer with his all-important manure; boys or children can take them to the village common grazing grounds and look after them. The calves both male and female, the former in the case of cows and the latter in the case of the buffaloes add to the money return from the business. The demand for dairy products, both milk and butter, is perennial and expanding and everywhere and at all times outruns the supply, and in the home itself they form a most valuable and much needed supplement

to the diet of the people. All in all therefore a more suitable subsidiary occupation cannot be thought of and efforts should be made to develop it on profitable lines. Both cows and especially buffaloes of good breeds should be made available, veterinary aid to check outbreaks of epidemic diseases like hæmorrhagic septicemia and others should be prompt and efficient. Good breeding bulls should be kept in the important villages, cattle feeds like oilcakes, cotton seeds, wheatbran and the like should be available for sale in the agricultural depots or co-operative stores, and the cultivation of fodder crops for supplying green fodder should be encouraged. These are among the facilities to be provided.

(*b*) *Poultry keeping.*—Much in the same class comes the keeping of poultry, although it cannot be taken up by all the villagers as many are forbidden to do so by caste rules and others may not have the necessary back yards or open space in the houses to keep fowls. Nevertheless the scope is almost unlimited. As it is, it is one of very great magnitude, as any one who has seen the quantities of eggs arriving in any of the *santhés* will know. There is room for expansion and also for increasing the quality and quantity of the eggs by the introduction of foreign breeds. The Leghorns, Orpingtons and Rhode-island Reds are world famous both in the number and weight of the eggs and in the quality and quantity of the meat. Considerable work has been done already by the distribution to selected people of a set of one cockerel and two pullets per individual and also of fertile eggs for hatching and the results have been greatly appreciated. This work should be expanded very largely and form a special feature of the villages included in the project area. It is a significant fact and favourable circumstance worth noting that much-dreaded diseases which used to wipe out whole flocks are now amenable to control, and with the increase in the veterinary staff, this handicap will virtually cease to exist. Poultry form, next only to pigs, the best means of converting all kinds of farm wastes or

by-products into valuable human food. Good results however cannot be obtained by merely this sort of forage, but will require better food, a fact which is ordinarily not realised, and in which therefore some instruction is needed as indeed in other aspects of poultry keeping as well, although the farmer's wife well understands the technique.

Sericulture.—In tracts (especially in Mysore) where silk worm rearing or sericulture is known and followed but is capable of expansion it may be desirable to popularise it further. It also fits into the business of agriculture and can form a profitable subsidiary occupation. It has the additional advantage that *gosha* women can engage in it as indeed is the present prevalent custom in many villages in the State. Many improvements in rearing methods have come in in recent years which greatly add to the outturn and the quality of the silk and which promise to raise sericulture to the status of a very important industry.

Market gardening.—Market gardening is also a side line which many agriculturists and even others who have only comparatively a small space like a back garden or compound can take up with advantage as is being done already; this however deserves to be expanded, especially with the increase in well-cultivation. Besides serving domestic needs and improving the family menu, this affords a small money income once a week or oftener, which is not to be neglected. The growing of new vegetables like tomatoes and other 'English' vegetables in addition to the well-established ones, aided by the supply of the seeds of choice varieties, the use of concentrated fertiliser and the adoption of prompt remedial measures against pests and diseases affords scope for this kind of subsidiary employment.

Food industries.—The preparation and sale of tinned, bottled or merely dried vegetables and fruits and evenof cooked delicacies of many kinds and of the many sweetmeats and articles of confectionary for which the country is famous is an industry which has an immense future and awaits the enterprise of capitalists. Suitable containers, whether of

tin or glass or even cardboards are being already manufactured in the country, and small-scale canning factories are also coming in, where efficient canning methods appropriate to each one are already known and employed. When one thinks of the innumerable canned foods and food products of the U.S.A., the magnitude of these industries and the money being made by these barons of the cooking pot and of the possibilities and resources in our own country, one cannot but think that here is an Eldorado for the entrepreneur of the future. Even now for those with a little enterprise a moderate but growing lucrative trade can be organised in the preparation and sale of the pickled, dried vegetables, raw or salted, *pappadams*, *vadams*, curry-powders and similar preparations which require no special canning process or containers. City life under modern conditions offers no facilities for the preparation of these articles in the households therein and a steady supply from the countryside will be greatly appreciated by these families. A little has been attempted here and there but this is only a drop in the ocean to what can be done. This industry is capable of benefiting a large number of poor households in the village and involve no special method or equipment and is in fact only a continuation of what each household does for itself regularly. The preparation of beaten rice (or *Aval*) is a well-known subsidiary occupation in many villages, though it involves considerable physical strain and hardship on the poor womenfolk who do the work. Machinery can come to their relief but this may mean bringing in factory methods even when the outfit should be a very small one comprising three or four pounding mortars and pestles.

Bee keeping.—The keeping of honey bees and the production of honey is a subsidiary occupation of some importance, and in certain tracts like the coffee districts and generally in villages where there are cocoanut, arecanut and other fruit trees or groves of *honge* trees or which lie close to well wooded forest, it can become a source of a fairly

moderate money income. In a state like Coorg for instance, and in the border taluk of Sakalespur in Mysore it is an old established custom for the inhabitants to keep bees, although in the old fashioned pot or basket hives, and the honey besides forming a good substitute for sugar for domestic consumption is furnished in considerable quantities for sale outside. New methods are being popularised by introducing box hives and small honey extractors, both of which improve the quality and quantity of the honey. On a well organised scale the honey is sold to a central organisation where it can be processed and bottled and a product uniform in colour and density and put up in attractive containers can be prepared for an export market as is done by the Bee Keepers' Co-operative Society in Veerarajapet, Coorg, or can be sold in its natural state on a small scale or used at home to eke out the all too coarse food and sweetening existence to some extent. With a well trained staff of men to go round and instruct, supervise and assist in all aspects of the industry, there is considerable scope in many parts of the country to help villagers increase their money income. There is no day-to-day work worth mentioning involved unlike other subsidiary occupations and if the instructions regarding cleaning, watching, preventing depredators and machine extraction are carefully followed the colonies can be kept on for years in good yielding condition.

The palm sugar industry.—In the districts where palmyras and date palms abound the making of jaggery from the sweet unfermented juice tapped from the trees has been customary from early times and has been a source of a moderate income to the owners and tappers, who however belong to a particular caste. Very good jaggery, sugar of various grades and sugarcandy have been made, and the jaggery besides being consumed as such has also furnished the raw material for the making of white sugar in refineries. These latter have been large and important factories and have functioned until the recent phenomenal development

of cane sugar factories on such a vast scale that they have shut out imports which used to run into 27 crores of rupees in value. The trees have also been tapped for toddy, that is, the fermented juice, so that they have been put to either use according to the profit accruing from them. With the recent introduction of prohibition, the tapping for toddy has been forbidden, and the juice has therefore to be put to the sole use of being converted into jaggery and to a small extent to be used for drinking as such, that is, in the fresh and unfermented state. This has brought in its train a big load of troubles involved in enforcing the law. Curiously enough although the trees used to be tapped for unfermented juice under a license whose terms were observed on the whole strictly enough, and in certain tracts without the need for any license at all *before* prohibition came, the new law against tapping for toddy has led to an orgy of clandestine breaking of the law, causing serious difficulties in enforcing it. As a material aid to the prohibition campaign on the positive side great encouragement is being given to the palm jaggery making industry in many directions, so that this fillip will help in diverting the juice from its use for toddy making. It is being developed as an important cottage industry and receiving perhaps special favours. It may be pointed out that even apart from this particular context it has claims to rank as a cottage industry of first rate importance worthy of all the aid that can be given.

In the first place the trees are almost in the nature of wild growth; the palmyras grow on the sandy waste and other unprofitable soils on which few kinds of trees or crops can grow, and although they are planted, they receive little further attention and are a great contrast in this respect to cultivated crops. The wild date likewise flourishes on both poor, stony uplands and in the hollows and the valley bottoms where water is likely to stagnate. Like the palmyra they are also sometimes planted but very little later attention is paid to them. They are not in one's and two's, but in groves sometimes very large in extent. The sugar value of the

trees is by no means small; the juice of the palmyra may contain from 16 to 18% of sucrose that is equal to average and even good sugarcane; the date juice may contain from 13 to 16%. The outturn of jaggery per season per tree which varies very much may be taken to be 80 lb. in the palmyra and 22–25 lb. in the date. The total number of trees of bo h palms in India is estimated at 50 lakhs approximately. The method of boiling down the juice is simple and well known and such improvements as are desirable, like liming, skimming, better furnaces and so on are also equally simple and inexpensive. It will thus be seen what a great national asset the country possesses in these palms.

It also happens that huge as the production of cane sugar is in the country, the demand appears to be far in excess of the supply. Prices have soared up on account of the short supply, whether real or fictitious and due to hoarding. Anyhow Government have been driven to the necessity of importing foreign sugar in substantial quantities. There is room therefore for harnessing the wealth of these palms and producing jaggery both for consumption as such and for purposes of refining. The refineries which are closed down may well recommence functioning and furnish a demand and an outlet for all the jaggery which it may be possible to produce. The high price of sugar may make it quite worth their while, and the new uses to which molasses are being put nowadays, will make it more remunerative. If the refineries do reopen and commence operation, the import by Government may take the form of raw sugar or refining crystals instead of white or refined sugar; the raw sugar may be sold to the refineries for refining and this will enable them not only to secure supplies of raw material throughout the year but also to manufacture sugar with lesser waste, both of which should contribute to their success. In any case, prohibition or no prohibition, the development of the palm jaggery industry as one of the cottage industries in the new set-up will appear eminently desirable.

The need for experimental or research plantations for both palmyra and the date palms must be emphasised in this connection, not only as part of the present campaign of prohibition and the manufacture of gur and various other products, but as a permanent measure for the accurate and scientific studies in these two important crops. At present it is doubtful if one is able to get correct and reliable figures about the many aspects of the gur making industry. The experiment stations will moreover serve as training centres for those who may have to do popularisation and propaganda work, in regard to the various uses of the two palms and not merely to the gur making part of it.

Hand spinning.—As a spare time occupation, the spinning of cotton by means of the simple *thakli* and by the *charka* comes in a class by itself. Unlike others it can be taken up by every one not only in the villages but also in the towns and cities whatever their usual avocation may be. The finished product, yarn, forms the basis of the raiment of the people, one of the two primary needs of mankind. It may not be a material source of income or even afford a worthwhile wage but it affords the satisfaction of producing with one's own hands part of the garment which one may wear. The ordinary ryot, that producer of the food of the nation, does not calculate how much he is going to make before he ploughs and sows, any more than one does before he starts to grow vegetables or fruit in one's own garden or backyard. The satisfaction of eating produce grown by oneself far transcends its money value. The pleasure of wearing a garment made out of yarn spun by oneself similarly cannot be estimated by the money value of the article. It is needless to dilate on this, because it has been raised to almost a religious level, and deservedly too, and it has assumed a sanctity for all, be he President or Prime Minister or peasant. The invention of improved *charkas* with which one can turn out three or four times the output of an ordinary *charka* has improved its possibilities, while the operation of a machine instead of a *thakli* adds

a further attraction to it in the eyes of many. Time was (as I have seen myself) when in certain villages the ryots grew their cotton, ginned it in their hand gin, spun the yarn and had garments made by the village weavers, garments both strong and durable. Without going to this degree of Arcadian simplicity, it may be a great gain if in every village enough yarn can be hand spun to run a few looms to handle the quantity and convert it into cloth. In any case no occupation capable of such universal adoption, affording such an honest and clean leisure time occupation can be thought of and its revival wherever it has waned and expansion elsewhere are devoutly to be wished for.

In concluding this section the general remark may be made firstly, that depending upon the particular natural resources and facilities available, many a saleable article can be made and a profitable outlet found for labour, so that no one need be an idle drone and dependant upon the wage-earner of the family, the useless 'rice-killer' as one puts it in racy vernacular, provided one feels keenly that it is a degrading position to be in, and that labour of whatever kind is dignified. "*Laborare est orare.*" The palms especially lend themselves to a variety of purposes and so do the plantains, aloes, etc.; the jungle affords many a useful product too, and even the soil can be dug in many places for white and coloured earths for sale. The imperative need and the sacred duty of labour has to be perpetually kept before the eye of the villager, and the ideas will not fall upon the way side or upon stony ground or among thorns but some at least will find a place on good ground and yield fruit manyfold.

Secondly, cottage industries and even small-scale factory industries, valuable as they are, can be considered only palliatives, as far as full and lucrative employment and a material rise in earnings in the countryside is concerned and cannot carry one far. In the last resort only the starting of large manufacturing industries of various kinds in the country, evenly and equitably distributed throughout the

different parts of the State and not concentrated in one or two centres can bring about the desired result, not only through the direct employment in the factories but also through the springing up of the dozen different avocations which automatically follow in the wake of such successful enterprises. The strikingly impressive development of the town and environs of Mandya, which has followed the establishment of the Sugar Factory, is an object lesson and pointer, which deserves to be taken full note of and pondered over.

The Mysore Rural Industrialisation Scheme.—It is very noteworthy that as far as the Mysore State is concerned a very comprehensive and intensive scheme of rural industrialisation affecting every village and every family therein has been taken in hand and is now in progress in two selected districts, *viz.*, Bangalore and Koḷar. The father of the scheme is the veteran and indefatigable architect of industrial Mysore, the nonagenarian Sir M. Visvesvaraya, who despite his advanced age has donned armour again and has entered the field with the same enthusiasm, drive and knowledge as in the days of the old Economic Conference, added to greatly with the prestige and renown he has won since those days. The Government is actively co-operating both with finance and with the executive agency of its district officers of all departments, and with him as expert preceptor, the villages have been roused into activity and much progress has already been made. Village Industrial Development Committees have been formed, charged with the duty of fostering industrial life in many ways; they are to make surveys of the existing industries, raw materials available, possible new industries, and the scope for expansion of the old ones; they are to collect economic statistics, on the basis of which progress could be measured from year to year; they are to help industries with loans and administer the funds made available to them; and generally to encourage hard work, discipline and a better-life mindedness. These have been converted lately into Industrial Village Co-opera-

tive Societies, and are affiliated to a Central Co-operative Rural Industrial Financing Bank, newly started for this purpose, and to which they have already subscribed Rs. 4,58,000 by way of shares. They are the primary societies to apply for, draw and disburse loans required by village craftsmen and for new industries much like the Land Mortgage Primary Societies. A large number of village industries so comprehensive that they include nearly everything that can be thought of is on their programme. The organisational set-up and the details of the working methods are very systematic and thorough, and will repay careful study. The progress so far is reported to be as below: Number of industries (units) started or expanded 5,933; capital invested Rs. 60,34,066; value of production achieved Rs. 1,45,51,349; and men employed 22,650. A recent brochure issued by the Mysore Government on Rural Industrialisation deals with the scheme in detail and is commended for close study by the Community Project Administration and the Extension Officers.

VII. CO-OPERATIVE SOCIETIES

It is just 40 years ago now that the co-operative movement was launched in India and during this long period it has grown to colossal dimensions, there being at the present time nearly 172,000 institutions of diverse kinds with nearly 10 million members and a working capital of Rs. 164 lakhs (*The Co-operative Movement in India*, by E. M. Hough). It is needless therefore at this stage to explain or dilate upon the advantages which may be secured to the people by harnessing the movement to the service of village improvement. The need has been fully recognised and provided for in the present Community Project set-up, by the inclusion of responsible co-operative officers in the staff. It may be useful however to deal briefly with some of the aspects of the work based upon the experience of the past and relevant to the present circumstances.

It is a well-known fact that it is the credit or banking side of the movement that has received most attention. Launched as the movement was primarily as a method whereby the farmer can obtain the necessary funds for his needs without resorting to the money lender and at easy rates of interest and other helpful conditions, it is perhaps natural and almost inevitable that it should have developed most along this line. Other fields of co-operation of a non-credit character both for the agriculturist and those engaged in other industries, rural and urban, have not been neglected but the number of such societies though large and impressive by itself is very low in comparison, being only 20% of the total number of societies. The greatest need is evidently for credit societies and especially so in rural areas, and it will be well if efforts are directed to the starting of such societies in the first instance or if such are already existing in the particular area to improve their working and make them really useful and efficient institutions.

For as is well known a number of rural societies are far from satisfactory in many ways. They are not able to serve the purpose for which they are intended and to advance money to the members who may need it. They have not enlisted the confidence of the bulk of the villagers most of whom keep aloof and still resort to the money lenders for their loans. Many societies have very little business to transact and are a languishing lot. Often times definite acts of mismanagement, of corruption and of monopolising the benefits by a few and even worse things have served to further estrange them from the bulk of the villagers and to curtail their usefulness. It is however possible that far too much is made of these lapses and of the 'black sheep' in the herd. The real and basic defect to which many of these drawbacks can be traced is the lack of sufficient funds. Their paid-up share capital is very small and so are their deposits, for the villagers neither have much to deposit nor the confidence to keep it in the society, even if they do have any small amount. Money borrowed from the higher banking institutions is lent out promptly to a few members and for purposes which do not admit of easy repayment and often for longer periods than is desirable. Repayments do not all come in when due and the societies' scanty resources are thus frozen up and are not available for further lending. In the result societies have little business to do and become almost lifeless institutions.

This basic defect has been taken note of in the new Reserve Bank's schemes for direct and adequate assistance in affording rural credit, and before long it may be expected that sufficient funds will flow into these institutions. That is a circumstance of the foremost importance and should lead to a revitalising of the societies and afford scope for the best endeavours of the co-operative staff.

The strengthening of this staff is also a favourable circumstance because their supervision, guidance and scrutiny will not only afford much necessary technical help but also prevent the lapses complained against. For there is no doubt

that the lack of such close supervision has been a contributing cause to the failure or weakness of many societies. "An open door tempts a saint" was a proverb which one Registrar in Mysore was never tired of quoting, and in the present set-up the door is pretty well guarded.

Moreover there is a large number of people coming forward nowadays to take up the burden of management and considerable competition for getting elected to the committee of management prevails; this also augurs well for much improvement in the quality of the services given. Past experiences are also a warning against malpractices, so that it may be said, all in all, that conditions are now very favourable. A society composed of almost all the villagers in which the members have confidence and who will be able to secure the small loans which they may require, and which will be as busy as a Post Office, should be the ideal into which the present ones should be converted. The ryot should go to the society for the short term loans required, say, to buy a few maunds of seed potatoes or of artificial manures, the petty trader should go likewise for a loan to buy goods for sale in the next market and the artisan to buy raw materials for a month's use, the blacksmith to buy the iron required to make ploughshares, hoe blades, etc., the cobbler the leather for making a few pairs shoes or sandals, the vegetable or fruit basket man the petty advance for buying a basket of fruit for street vending—all of which will permit of the loan being repaid promptly.

A credit society moreover is the easiest to manage; there is neither the risk of loss by a fall in prices or deterioration of stock as in a trading society nor the investment of capital in goods which may sell quickly or not. There is no complication with machinery, repairs or breakdowns or other technical difficulties as in the case of societies using power machinery for various purposes and so on. So that besides being very important and necessary by themselves the credit societies have these further advantages over other types of societies.

There is also considerable scope for many agricultural societies, such as for the purchase and sale of produce and of stores, for the installation of pumping plants for irrigation, for sugarcane milling and others, into the details of which we cannot go here and for which my book on "*Co-operation and Indian Agriculture*" may be consulted. These however would require for one thing considerably more technical ability than may be available in rural parts but if this could be secured they are eminently suitable for being taken up. There is however one line of business which can with advantage, and indeed should, be combined with these credit societies and this is the stocking and sale of agricultural requirements such as improved implements and manures, seeds, spraying materials, etc., and of such consumer goods as the members may decide to stock for sale. Reference has already been made in more than one place in these pages for the need of stocking such articles in village societies but it may be added here that it should be attempted to stock and sell them on a consignment basis and not to invest funds in buying outright wholesale for selling retail. It will generally be possible to do so and this method which has obvious advantages should be explored and adopted.

The multipurpose societies.—In this connection it may be noted that the starting and working up of multipurpose societies is to form part of the development schemes in the Community Project and Extension areas, and that much is expected of them, even to the extent of making them the administrative agency for looking after all the development schemes, after they have been launched. There is no doubt that multipurpose societies have much to be said in their favour and the idea is a very alluring one. These societies will not only do the banking business for the villagers, especially lending them at easy rates of interest and under co-operative principles, but will in addition be a co-operative store supplying practically all their requirements, grocery, clothing, provisions, utensils, etc., and the agricultural requirements mentioned already; above all they

will receive and market the ryot's produce to his best advantage. Moreover, they will take up all other co-operative activities as well, both agricultural and industrial, for which there may be scope. In fact the villager is to resort to only one society for all his dealings and is to be saved from the need to go to the money lender, the shop keeper or the *mandy* merchant and to secure the benefits usually associated with co-operative effort. Moreover the Directors and members of any single-purpose society, be it banking or others, are bound to be more or less the same people, and seeing that competent personnel in sufficient numbers is always lacking in the villages, it will tend to economy and administrative convenience to have them serve only one society and concentrate their activities therein. Worked efficiently, such a society may develop into a veritable co-operative commonwealth in miniature, useful to them in every concern of their individual or communal life.

On the other hand it is argued that the very multiplicity of the activities which are claimed as its special advantage will be its main source of weakness, making it all the more difficult to manage them efficiently. When people are found not capable of managing properly a single-purpose society like an ordinary credit society, which is the simplest form of a co-operative society, it is futile to expect them to manage efficiently a society with multifarious activities. In fact it is the difficulty of management that prompted many Registrars to be hesitant in recommending them.

The combination of banking with trade such as the purchase and sale of produce and other goods is not considered desirable by competent authorities, but such a combination is the very essence of these societies. The Royal Commission on Indian Agriculture was also against the idea and stressed the need of " one thing at a time ", chiefly of course on account of the difficulty in management.

On the other hand it is reported that a large number of multipurpose societies are working very successfully in the U.P. there being about 2,000 of them. During the period

of the various controls, elsewhere also every credit society became virtually a multipurpose society, to the extent that they added the sale of all controlled articles to their regular business of banking. So that, one need not take the dictum against the societies as sacrosanct, or attach too much importance to the difficulties raised.

As a matter of fact, in Mysore true to its traditions, the difficulties were ignored in view of the benefits expected, and the starting of these societies was taken on hand and pursued with hectic enthusiasm. Within a period of one single year, as many as 823 societies came into existence, with a membership of over a lakh and a half and a share capital of Rs. 26 lakhs, almost as if at the waving of a magic wand. Unfortunately for various reasons (which it will be very profitable to examine) many of them have suffered from the same blight as several others in the past and have become another warning. All this has happened notwithstanding the great progress in education and public spirit among the people, and the legacy of many-sided experience during well-nigh half a century of the movement. It only underlines the need for extreme caution, at the risk of being slow and even unprogressive, and it will be well to concentrate on the existing credit societies adding to them such other activities as may be safe and practicable, and according to the scope and need of particular villages. I am reminded of a proverb with which a cautious friend administered a cold douche to my enthusiasm, *viz.*, I was like "the man who could not pick out the granules of stone from the rice on his plate but yet attempted to pull out the stone block from the temple wall". The moral is too plain to be missed and too useful to be resented.

Co-operative farms or colonies.—In the same category come the various forms of co-operative farming, which are also strongly recommended and which may have to be taken up in the project and extension areas. There is of course considerable traditional co-operation among farmers already in respect of many agricultural operations such as ploughing,

harvesting, threshing, sugarcane milling, irrigation, etc., and it will be very desirable to further cultivate this valuable asset and harness it to all aspects of farming right up to and including marketing. The organisation of regular co-operative societies for the purpose is however a different matter and many practical difficulties will have to be overcome. Co-operative colonies have been started here and there, a somewhat notable and successful one in South India being one in Wynad. In Mysore many colonies of agricultural graduates and of other eligible young men have been started, which were expected to be worked by the settlers in a co-operative manner as far as possible. In addition to these quite a number of regular co-operative farms or colonies, whose number is put down as 21 have also been started in the State. They have been granted extensive lands, money advances have been made as outright grants or as loans and many other concessions and help also extended. The money grant alone has been reported to be from Rs. 25,000 to Rs. 37,000 for each society. Nevertheless their history has been one of struggle against odds, a never-ending shortage and need for money, and a fight against disruptive and individualistic tendencies which strike at the root of the co-operative idea. It is hard to tell how many are surviving as regular co-operative farms but in any case they are not such as to arouse enthusiasm or inspire confidence. Their potentialities for good are great and it will be well to examine the causes of this state of affairs, set them right and make them real successes before embarking on others. They have many difficulties, and require prompt and sympathetic treatment from many departments, the revenue, irrigation, excise, forest and so on and delays due to official formalities prove almost fatal. It is a question why in the initial stages and until they become self-supporting institutions, if not profit earning ones, they should not be placed under the supervision of a special officer of suitable status with sufficient powers who will attend to all that may be necessary adequately and in time, so that their success may be assured. Of course alter-

native methods may be found which may be more in conformity with orthodox co-operative principles. In any case these and other cognate matters deserve to be carefully studied, before more societies are started; there is ample materialfor such a study and the findings should prove of great practical value.

Marketing societies.—Co-operative marketing societies for the marketing of the ryots' produce can afford much relief to them not only in freeing them from loss, annoyance and harassment but also in securing them a better price for their produce. Much of the success in crop raising may be neutralised considerably by losses at the marketing end, and co-operation affords the only way by which this can be avoided. All the drawbacks in the local systems of marketing which act prejudicially on the ryot are too well known to be described, and the introduction of the Regulated Markets system in all the important marketing centres which is intended to put an end to all kinds of malpractices in the trade may be expected to fulfil expectations. Even then however the benefits of co-operative marketing societies will remain very substantial and the need for such societies will continue. Attempts should be directed to the starting of such societies in the chief marketing centres, and not as village societies in the manner of the credit societies, so that they may cover a much larger tract than a project or extension area may do. A more efficient management is likely to be secured by this method which is very important and which cannot be expected in village centres. Moreover a much larger bulk of produce will converge in a marketing town and conduce to better business.

Luckily the marketing societies started in Mysore have been notable exceptions to the many kinds of non-credit so ieties and have in the main been successful. It may be advisable therefore to attempt the starting of these societies for different kinds of produce, single or composite, depending upon the volume of the produce to be handled. If past experience is any guide, this development holds promise

of success and of material benefit to producers. With loyalty on the part of the producer members in delivering their produce to the society and with an efficient and honest management, such societies have every chance of proving successful.

PRINCIPAL, TRAINING CENTRE FOR VILLAGE GUIDES
4 MAR 1955
GANDHIGRAM

PART II

VIII. METHODS OF EXTENSION OR POPULARISATION

Publications.—Among the methods of 'extension' or popularisation of agricultural improvements, the medium of the printed word is a very favourite one and has been widely adopted. It is probably the oldest among them. The publications branch of the U.S.A. Department of Agriculture may perhaps be said to lead the world in this matter and to be looked upon by that department as almost the sole method of extension. This forms an important part of the work of the Experiment Stations and the Colleges of Agriculture; every branch of agriculture, both crop and animal husbandry in all their aspects, is covered by these publications and the departmental officers spare no pains in making them as useful in matter and as attractive in manner as possible; they are printed in high class art paper, lavishly illustrated, charts, tables and pictorial aids are largely resorted to, and the publications themselves are supplied free of cost or at a nominal cost, to any one who may apply for them. It is extraordinary how once a party's name has been put on their mailing list, the supply is continued regularly for periods of even twenty years, as I can tell from my own experience. A friend who was himself a Director of Printing in Mysore and who visited their Library and worked for some time there, informed me that the vastness of the institution, the immense scope of the work, and the scientific system and thoroughness, are features which strike one with wonder, and can be appreciated or believed in only by an actual visit.

Though this line of work can nowhere else be seen on such a vast scale, it is adopted by agricultural departments all over the world each according to the funds and facilities available. In Mysore and in other States, quite a respectable volume of such literature each appropriate to the particular

region, has been produced, all of which will quite repay perusal. This kind of 'extension' literature generally takes the form of (1) pamphlets or leaflets, on single definite subjects, usually of permanent interest, (2) newspaper articles either of the same nature or dealing with matters of immediate importance, such as the combating of pests and diseases, or of seasonal application at the time of ploughing, sowing, manuring, earhead selection, roguing out mixtures, threshing and so on, and (3) a Monthly or Quarterly Journal generally of a popular type. In addition there may be memoirs or scientific publications bearing upon any particular research work carried out in the laboratory and on the farms, which may be published at irregular intervals when the work may be completed or earlier if deemed fit for publication. Their appeal is of course very limited, but in some cases they may be so written as to have a wider appeal to scientific and lay men alike.

As this kind of popularisation work will continue to be carried on and probably in a more intensive manner, some of the features which it may be useful to take note of as the result of past experience may be dealt with here.

In the first place, all this literature has been published primarily in the English language, which may appear anomalous when one remembers that it is meant all the time mainly for the benefit of the agriculturists most of whom do not know the language. It may be traced to the fact that in the past the high officers in all the departments who alone were deemed competent to write and issue such material were Englishmen. English moreover enjoyed (and continues to enjoy) a prestige and importance not only because it is the official language but also because of its inherent development and capacity to express ideas in a manner which the vernaculars had not been cultivated sufficiently to cope with. Translation has been exceedingly difficult and even when attempted and put through, the result was such that it was so strange and outlandish that it required a commentary to make it understood. New

words and turns of phrase had to be found and the style which closely followed the original was something quite foreign to the familiar vernacular and made it more difficult. I remember one particular case when an Annual Report of the Mysore Department of Agriculture was ordered to be translated, because it contained a great deal of useful and highly instructive material. A Kannada translation was accordingly prepared and issued, but it was so stiff and artificial in style with a highly Sanscritised diction and newly coined words and phrases that as a vehicle for conveying these ideas to the ordinary agriculturist it was thoroughly useless. Later reports had to be entrusted to a better scholar but even this was not a signal success, though a great improvement upon the first performance. The difficulty was inherent in the subject itself however competent the translator was. I am speaking of the very early attempts, probably things have materially improved in recent years.

It must also be stated that the English language exercised (it does not seem to have ceased to exercise even now) such an irresistible fascination that even those who could write and speak with facility in the vernacular preferred to use the English language instead, with the result that the vernacular suffered so much neglect that educated people can hardly speak in public or carry on a private conversation in vernacular without a large admixture of English words. I am afraid this trait is even worse now, and has afflicted not only men but also women.

Another result of this attitude is that the vernacular publications of the departments being translations of the bulletins, journals or leaflets, are simply cold-shouldered by those for whom they are intended, and compared with the English originals are nowhere in popularity. It is always a popular cry that the publications should have vernacular editions, which is quite legitimate and has to be heeded, but unfortunately when at great pains such editions are issued, there is very little demand for them. I have very painful experience of this reaction to our efforts. I was

the first Editor of the "Journal of the Mysore Agricultural and Experimental Union (now the "Mysore Agricultural Journal") and continued to edit it for three years. It was an English journal but a Kannada edition was soon issued also, which was anything but popular. Likewise I founded the "Monthly Bulletin of the Bangalore Dairy Cattle Society" (now "Indian Dairyman") and edited it for nine years. Of this too a Kannada edition was issued, which also shared the same fate, and in both cases the Kannada editions were simply dead stock on the shelves of these offices. One has to admit with sorrow that much of this solicitude for the vernacular vanishes when it has to be translated into action. The attempt however is far too important to be given up and one has to persist in it in the hope that matters will improve. As a matter of fact the publications themselves have greatly improved, in that they are no longer mere replicas of the English editions but are almost independent publications containing articles suitably adapted and new ones in addition. The change is appreciated evidently, for it is reported that the old indifference has worn off. This has implied a slight lowering in the standard of the material presented, but this does not make any important difference. Moreover both vocabulary and diction are capable of improvement; the correct words used by the farmers themselves must be employed; wherever vernacular terms are available, English terms should be avoided such as the names of months, seasons, implements, etc., and a less literary or 'bookish style' adopted, all of which will still further wear off the unpopularity of the vernacular propaganda literature.

When all is said and done, the printed page can appeal to and serve only a small section of the people, as the large majority are illiterate, and if in addition it should be in the English language it can benefit only a microscopic minority. Within this limitation, however, the scope is still fairly wide for anything which may appear in the daily newspapers, and this aid deserves to be

availed of more and more. Articles of a practical nature and fitting local conditions and methods like a glove, and not diffuse and of a general kind, published regularly or in the appropriate seasons can serve a very useful purpose; they are likely to be read and also retailed and talked of in the villages. As already hinted the chief requirement will be to divest them carefully of any bookish flavours; that is to say, the ryots' language should be used, the technical names of the operations or the names of the different implements and their parts should be employed and not any circumlocutary way of describing them, the months and periods referred to should be in terms of the *nakshatra* rainfall and not of the English calendar, weights and measures should be expressed as far as possible in local maunds and seers and not in cwt. or lb., and so on. Above all, they should disclose an intimate knowledge on the part of the writer of the conditions and methods and of any difficulties or objections that may be raised, which should be anticipated and answered. The newspapers will be only too ready to co-operate, and in my days I contributed weekly Kannada articles to all the vernacular papers on set subjects of this kind, and to some good purpose, I would fain believe. Anyhow it is about the best medium through which the printed word can be employed for this purpose.

In some departments (in Madras and Mysore, as I know) an annual Calendar is published in English (especially in the beginning) and later on in the vernacular also, which is a kind of "*panchanga*" but contains in addition useful articles of a practical nature, often the results of experimental work communicated as recommendations. A special feature of the Mysore Calendars are the monthly notes, which briefly mention a few do's and dont's connected with the operations falling in or about the month. The 'panchanga' is much sought after, is largely taken and used, and so, this way of interweaving it with Extension material gives the latter a sure chance of being used as well. There is no reason why other matters of rural welfare, especially in regard to

health and sanitation should not be included and the publication also made both more attractive and useful, and sold at a nominal price. Next to the daily press it is a very fruitful medium of instruction.

In 'go-ahead' Mysore the journalistic method of 'extension' has by no means been neglected. Even as early as some fifty years ago, there was the "Revenue and Agricultural Gazette", in Kannada in which matters of rural and agricultural improvement formed a part of the orders and circulars of the Government in the Revenue Department; these latter were eagerly consumed, but the former were there too to form a mixed diet. Then there was the "Mysore Economic Journal" (in English) and later its Kannada edition called "*Arthasadaka patrike*", the former a fairly high class journal and the latter a popular one, but both containing articles of much educative value calculated to stimulate people's interest in economic development, in agriculture, education, commerce, industry and village improvement. The Kannada performances suffered from all the familiar ills they are heir to and have long been defunct, although they were liberally supported by Government. The "*Gramabyudaya*", another Government-financed Kannada journal devoted to the same cause, has taken their place, and so the regular publication of a journal as an aid to village improvement in particular and economic development in general enjoys a measure of continuity through more than half a century. In the present set-up of the Extension services, "*Gramabyudaya*" may receive a great fillip and may enjoy a measure of popularity which the others struggled hard to achieve but perished in the attempt. An editor with enterprise and used to the various modern journalistic aids can with the co-operation of the several development departments greatly enhance its usefulness, avoid the familiar drawbacks and may succeed in putting the elements of longevity into it.

The co-operation of the various departments is very essential, perhaps indispensable, and I have put it down

advisedly, because in practice this may not always be forthcoming in such a hearty and full measure as may be desirable. It may be that the heads of the departments may think that they know their business and may not like being asked to write on this or that, and resent such action as tasks, set to them by well meaning but amateurish officers eager to rush the pace. In any case the disposition may be lacking to put their necks under the yoke of a team. Although it may not mean non-co-operation by any means still the attitude cannot but retard progress. I am only referring to a somewhat remote contingency, but its possibility should not be excluded.

Lectures and the spoken word.—The printed page being thus a poor instrument under the conditions of literacy in the country, despite the very wide audience it can reach, one has to resort to the spoken word. Of course this can reach only a very small number almost negligible compared with the former, and even though at large gatherings and at formal addresses there may be a fairish crowd ordinarily, at village gatherings it may dwindle down to a trickle. But in the matter of the agricultural and village improvement p o-gramme which we are considering it will make up by the more satisfactory results achieved. The talks are understood by all who are addressed, be they few or many, and the appeal is direct. It should be considered therefore a more efficient instrument and indeed in most cases practically the only one possible, or available; the fullest use has therefore to be made of it and every means adopted to enhance its usefulness to the maximum extent possible.

It behoves all those in charge of Extension work to equip and qualify themselves for this important task of addressing audiences in the vernacular language, of explaining the various matters which will have to be put through in the most effective manner, whether it be to the individual ryot in his field or an audience at set meetings. It may be useful to refer specifically to some of the requirements of this type of work, for the guidance of workers not only at the district and taluk levels but also those at the village level.

To some of these reference has already been made in connection with the publication side of the campaign, but they will bear further emphasis. The first will be a sound and accurate knowledge, especially with reference to the particular agricultural conditions of the tract. This assumes even greater importance in these personal contacts when each one has the opportunity of asking questions; the speaker is there to answer them unlike the writer in a journal or newspaper. A man with imperfect knowledge is easily spotted on such occasions and bowled over, which is not a situation calculated to evoke any confidence in the speaker. A knowledge also of the ryot's language or peculiarities thereof, and above all the technical names of the various operations and their details, of the different implements and appliances and their parts is very necessary, because a lack of it or a blundering or halting manner of describing them will easily betray one as a stranger to what he is talking about, which also is a fatal handicap to further work. The villager has generally little sympathy with a paid Government man going to him suggesting improvements, is suspicious of its motives, and in any case looks upon him as not one of his class, but as a town bred soft job holder, belonging to what are sometimes called "white-collar" or "black-coated gentry" in the U.S.A. or the white *dhoti wallah* in this country. Sometimes the villager's attention during one's discourse will be directed more to the lecturer's lace turban, shining boots or collar and tie and his mind will be following that track to the exclusion of the precious ideas which he may be trying to put through. During one of my tours I happened to be using a motor cycle, and stopping at a threshing floor on the wayside, I tried to improve the shining hour by explaining better methods of threshing and allied matters; imagine my chagrin when after a few minutes of this talk someone asked me if I used water for the machine as he had seen in motor cars or only kerosine which he smelt. And all the time I was fondly imagining that I was driving home and filling his mind with threshing improvements.

Such a distraction is a common occurrence, and I am reminded of a Zenana mission lady (Miss Amy Carmichael), who relates that on one occasion when she was preaching to an audience of village women about Jesus Christ and the Christian doctrines, and paused to invite questions, she was asked why she was wearing a lot of birds' feathers in her hat ! I think this lady determined to appear in later meetings without any distracting fripperies and barring the colour of her skin, to seem no different from her hearers. I am relating these anecdotes to show how easily your stranger's garb distracts the attention of the villager, and how necessary it is to erase as far as possible such features as may intensify the feeling that you are different and cannot feel or speak like one of them.

Next to accurate knowledge comes the language and the method of presentation. I have already mentioned that a bookish flavour should be avoided. A common fault which gives rise to such a flavour is the use of English names; for example, seed rates being expressed as so many lbs. instead of seers, planting distances as so many feet instead of '*molas*' or '*maroos*', and yields being expressed as tons or cwts. instead of the customary measures like pallas or seers or maunds, or likewise expressing the ploughing, sowing or harvesting season as months of the English calendar instead of using the names of the rainfall such as Bharani, Mrigasira or Pushya, etc. As in the case of the written material, such methods stamp it as book stuff and take away from the effect; they have to be scrupulously avoided even more in these talks than in writing. I have noticed that even radio talks for the villagers are not free from this defect, although the speakers affect the local drawl or other peculiarity of speech to perfection.

Like everything else these qualifications can be acquired only by some amount of purposeful practice. Perhaps if I relate my own experience this may be better understood. As a matter of fact I have related them to my own students, many of whom became Agricultural Inspectors (or Extension

Officers as they may be called under the present set-up) and served under me, so that it may be taken as a useful piece of guidance and not mistaken for any self-laudation on my part. The first was the opportunity to move among ryots in the midst of their agricultural operations for weeks together at a time. My first tour for District work (now called, Extension Service) lasted for over 40 days, continuously, and I had to undertake many such in those days. Those were not days of fast locomotion, an ordinary bicycle, bullock carts and just plain walking being the means of going about. Halts of several days in the larger villages, and a slow trudging from village to village, talks with ryots everywhere often participating in their operations, addressing gatherings where such could be secured, formed the daily round; excitement was not wanting, as on two occasions I had a spill owing to the overturning of the cart during a night journey once (on the Malebennur ghat) and during the daytime on another. Travelling sometimes in the Amildar's padded touring cart, over bumpy cart tracks on a pitch dark night, preceded by the village *toti* making darkness visible with his flaming fire brand, which he whirled into a blaze whenever it went out, the village dogs barking as if hell was let loose, excited villagers turning out, and doing the honours, and furnishing a relay of the flame bearer (Olympic game fashion), and an escort which soon dwindled to a trickle—all these provided a minor excitement. Almost the first thing I studied up was the *nakshatra* rainfall, which I afterwards invariably used instead of the English calendar. The names of the various implements, and especially of their many parts, I gathered as I went along, and these comprised a large variety, ploughs of all kinds, hoes of many sizes (*kuntés*), seed drills (*koorigés*), harrows (*halubés*), levelling boards (*mara*), interculturing hoes (*yedé kuntés*), the kapile water lift or mhote with its parts, the hand gin (or *ratté*), the sugarcane mill and all the milling house appliances, butter churns, manger fixtures, etc.; the names of the various operations and the ryot's way of describing them, the details

of the cultivation of every crop from sowing to reaping and processing, and other special terms came to me every day and I simply absorbed them through every pore. Of everything I learnt in the day I made a careful note with drawings where necessary, and generally on the following day 'practised' them upon other ryots when a chance came, and if one did not come I made one for so doing. I scrupulously avoided the using of any English words even in those early days and later on in my service though I may have addressed a few hundred meetings (without exaggeration) lectures, classes, conferences, University Extension lectures, short course lectures to ryots, and so on, I systematically used nothing but the vernacular which facility was acquired by purposeful application, needless to say. On many an occasion, the English educated section of the audience, Government servants, lawyers or teachers would not grasp what exactly was meant, but the ryots could do so easily, because I was talking their language or lingo using many technical terms, with which the former had no touch. I have impressed this course on all my subordinates in my time and many of them became quite adepts.

Much water has flowed under the bridge since then and there may be better means available of acquiring this proficiency, but a purposeful application and a zest for the work are quite as necessary now as they ever were. I would also suggest that in the Extension Service training centres, some time may be set apart for acquiring this knowledge, the necessary facilities like a complete collection of implements and other needs may be provided and the trainees themselves made to talk only in the vernacular.

Demonstrations of the processes or appliances which are being explained during these talks add greatly to their effect and are valuable aids which should be made use of. Any elaborateness may not be possible at regular meetings as may be out in the field; likewise demonstrations whose results can be seen only after several weeks like those on crops, are also out of the question. Nevertheless there are

quite a number which easily lend themselves to be conducted at set meetings, indoors or out in the ryots' field. These not only enhance the effect of the talks but also enable listeners to follow them closely, to avoid distraction and to engender the feeling that the subject is part of their daily work in which such improvements are suggested. The following are a few examples which I have always found both suitable and effective. Seed selection and seed treatment are easy to demonstrate. It may interest and perhaps surprise many to be told that selecting heavy seed paddy by the salt water method (which is applicable to ragi as well) was the very first process demonstrated by me in my extension work (during the year 1912) although it is recently being boomed as part of the new method of Japanese cultivation. The washing of jola seed in a solution of copper sulphate as a preventive of the smut disease is another equally simple one. I remember that on one occasion, my talk synchronised with jola sowing time and quite a number of ryots who were taking seed to the fields came forward to have their seed lots treated with copper-sulphate. The use of litmus paper to test the correctness of liming sugarcane juice is a third one which can be used at such talks, as well as at the milling sheds. The use of lime-water to clear up muddy water to make the fine clay settle as a sediment is a fourth, which will show the advantage of liming to correct the stiffness and impermeable character of heavy clays. No ryot goes about without lime for his *pan* chewing and it is easy to get at these gatherings. The seeds of sannhemp and (if possible) a few plant specimens can be shown; kappas (seed cotton) showing the difference in length of staple of superior quality against inferior ones can be shown and explained; new manures (they are no longer so new as they were in my time) like the different oilcakes, sulphate of ammonia, superphosphate of lime, etc., can be shown and samples handed round; the rubbing of a pinch of ammonium sulphate with lime between the fingers which gives rise to pungent ammonia is always exciting; the parts

of an improved plough bottom can also be shown and their special features explained. If specific subjects are to be dealt with such as, "all about particular crops", quite a variety of cabinets of actual specimens, photographs or charts can be got together and explained. If a field should be not far away from the meeting place and is in a fit condition for ploughing the gathering may be invited at the end of the meeting to witness a demonstration of ploughing with an improved plough in contrast with a country plough; these ploughing demonstrations always aroused the greatest interest although they may not do to the same extent now because they have become quite common now and several thousands are in use. If the parties are out in the fields themselves, attention may be drawn to the several points in which improvements are suggested; single or other economic seedling transplantation of paddy, the selection of good earheads for seed, improved jaggery boiling methods, furnaces and appliances and similar ones in respect of whatever crops may be growing, may all form excellent demonstration aids to the talks.

Demonstrations

None of the methods described so far, such as publications like bulletins, leaflets and circulars, attractively got up charts and posters, etc., or speeches at meetings of various kinds, including even village talks can appeal to or impress agriculturists in the way that ocular demonstrations can. As an instrument for the successful persuasion of people to adopt any particular new method that may be recommended, the demonstrations come in a class by themselves, and the rest are nowhere in comparison. Reference has already been made to this method in its rather minor role as an aid to the talks at village or other meetings, but in view of its importance as a major propaganda method we shall deal with it in some detail.

The role of the Government farms.—The departmental farms naturally serve to some extent demonstrational

purposes also, where new crops, new varieties, the effect of manuring with new manures, the working of new implements, new methods of cultivation and so on, may be actually seen. More than one implement, crops variety, method of cultivation and others may be under trial and experiment, and both successes which have to be recommended and failures which have to be avoided may be seen.

But Government farms always suffer from the drawback that people consider them as being run regardless of expenditure, without taking any note of the ryots' conditions and resources. Many items of equipment which may be in use and necessary in the interests of efficiency and of accuracy in the experiments but which are not directly connected with any demonstration, may not be correctly discriminated against. Efficient fences, well-built farm buildings, barns and cattle stalls, high priced, large and strong bullocks, carts, weigh bridges and so on, not to speak of the large staff, which form features of such farms, take away largely from their demonstration value, to the generality of ryots. To relate a curious incident in this connection: Before the Mysore Government department had any farm at all and prior to the opening of the Hebbal Farm, some small trials with sugarcane, potatoes, fodder grasses, etc., were conducted within the compound of the office building itself which happened to be enclosed by a stone compound wall. The water supply was derived from the domestic supply main itself. Both these became straight away the subject of sarcastic ridicule for local wags, who wrote that the expert was teaching people to grow sugarcane in stone walled fields and irrigated by tap water ! When the Hebbal Farm was opened, the buildings and fixtures were according to the approved Canadian style, cattle stalls were well protected and paved, and were fitted up with stanchions for securing the bullocks; the fields were laid out admirably for experimental purposes, the design being novel and unique in India and being looked upon as a model by departments in other parts of India as well. The expert Dr. A. Lehmann, a

Canadian German, was both a practical farmer and a highly qualified agricultural chemist, who worshipped at the temple of scientific caution and accuracy, and built for eternity; but these gifts which he brought to bear on planning his work most conscientiously were to the ordinary people such as greatly detracted from their value of applicability to our conditions, and unkind critics were not slow to condemn them and even hold them up to ridicule.

Departmental farms are intended primarily as research or experiment centres, as really "field laboratories" as was very aptly described, and have to maintain a certain standard of method and equipment in order to safeguard accuracy and efficiency, without which they will fail in their objective, though in the case under reference the standard may have been set too high for some. Many of the features like buildings, fencing and others will have to be necessarily of a substantial and permanent character, in the interests of economy in a permanent institution of this type, while others like water supply, staff, etc., will have to be adequate, and a guarantee of accuracy in the results should be the guiding factor; otherwise it will be a case of false economy and moderate but inadequate expenditure incurred will be money thrown away.

On these experiment farms although many trials and experiments, laid out on systematically well arranged plots and replicated as well, of many kinds varietal, manurial, cultural, etc., may be going on, still a few portions of the work will serve as demonstration also, which will be of direct interest and value to visitors. A certain amount of discrimination between the essential and the non-essential from a demonstration point of view will be necessary in judging about their functions and value, and the best use should be made of the demonstrational part of the work. Even on farms where demonstrations are the main object, a certain amount of experimental work will always be there, at least for the sake of comparison. What these farms can demonstrate is any one or other among many items of

improved agriculture, such as a new crop or variety being grown, the effect of one or more new manures which may be under test, the spacing of particular crops, wider or narrower than usual, heavy or light irrigations, particular treatments against pests or diseases, improved methods of jaggery boiling and a dozen other such items, and not the whole gamut of farming in any particular manner. It is these items which have to be picked out and pointed to visitors for copying, wherever suitable, as part of the Extension service.

If the farm serves this purpose, it has certainly justified its existence, and that should be the criterion and not the question whether the farm as a whole makes a profit or not. The demand that Government farms should be profit-making concerns is made generally in a spirit of challenge, a sort of fighting call to the department to demonstrate that farming is profitable. The challenge may be accepted and profit-making farming concerns can certainly be run; but, whom will it help and for whom will it be a demonstration? Surely not for the average ryot with a few acres of scattered fields, growing a variety of crops, a little of each according to his needs, in the midst of others each free to follow his own way, and under conditions over which he has no control. Obviously it is the role of Government to help these people and not run farming enterprises to demonstrate profit-making. Judged by this test the present type of farms must be said to be the most suitable, and the expenditure worth while and legitimate, because no private agency can undertake such work and Government alone can do it. The present methods take note of the actual conditions and try to meet them in the best manner possible. A ryot sees, for instance, during his visit a new variety of sugarcane or rice or groundnut, growing strikingly superior to the local varieties or a method more economical or convenient than the one he is used to or any other single item, an A or B, to his liking and simply takes it up; there is no need for him to bother with the other features on the farm or the over-all financial

results or the A to Z of the working, and the farm to that extent should be deemed to have fully justified itself. I have dwelt with this aspect of Extension work at some length because the point is frequently mooted and acts as a brake on this branch of the work.

Increasing the number of farms.—For a rapid spread of improved practices, it is of great importance that the number of such farms should be increased. Desirable as they are all over the country, in Mysore they are particularly important, because of the diversity of agricultural conditions, and of the regional differences in the nature of the crops grown and the methods adopted. A few years ago it was planned to open quite a number of regional farms for the areca and malnad crops area, for the cotton tract, for the *kar* ragi areas, the channel tract in the regions to be served by the new irrigation projects, for the cocoanut tracts, the eastern dry tracts served largely by well irrigation and so on, so that they could serve on a modest scale as demonstration centres, as seed-growing farms, as depots for the sale of implements and spare parts, as plant protection service centres, etc., for the crops and conditions of the tract concerned. The proposal has I believe been shelved, but it deserves to be taken up and carried out, as part of the present schemes of the Extension service; nothing can prove a more effective aid to the campaign.

Visits to farms.—An equally important matter in this connection is to encourage farmers to visit the farms, either on specially organised occasions, for showing them round, holding a number of demonstrations, etc., or casually whenever it may be convenient to them, preferably when some particular operation may be in progress or in the middle of the crop season. It is obvious that without such visits the farm will not be serving one of its most important functions, nor the people benefiting by the work; but these visits are rather difficult to secure. Special efforts and persuasion have to be resorted to and even pecuniary help extended. The fact is that few farmers evince sufficient

curiosity or inclination to visit the place and find out what is being done for their benefit. This is the case even with those who may not reside far away from the farm and for whom therefore it will involve neither the time nor the expense of a long journey. The inertia or indifference is sometimes so great that even if a demonstration plot or field should be in one's own village it is not visited by neighbours to the extent we should expect. "Why should I visit another man's field, while I have plenty to do on my own" is a reply I have sometimes received from such farmers. They are apparently either too independent or too busy and self-centred. Even those who sometimes loudly criticise the working or shortcomings on the farms do not base their remarks upon an actual visit, which is evidently not so easy as talking. This has happened many a time. To the large majority of people, the trouble and expense of visiting the farms situated far away from their homes is a real difficulty, and an increase in the number of farms as suggested, will besides meeting the requirements of regional diversities, also overcome this great difficulty and make it somewhat easier to people to visit them.

Special efforts and encouragement will however have to be resorted to even when the number is increased, but in the early days they were indispensable, and they took a variety of forms which it may be interesting to recall. As far as the Hebbal Farm was concerned, the organisation of "Short courses" at particular seasons was one of them; these were for periods of three days, during which visitors who were generally from nearby villages were welcomed, showed round in the mornings when special demonstrations were arranged; in the afternoons classes were held for them and lunch provided as well. The subjects for these short courses were 'tillage and tillage implements,' 'manures and manuring,' and 'sugarcane cultivation'. On a few occasions batches of village schoolmasters were brought in for a week's stay during their vacation, with the co-operation of the Educational Officers, during which also parties were

taken round, special demonstrations held as practical work illustrating the class lectures. The District Economic Superintendents also arranged for bringing in leading agriculturists from their districts in batches (at the cost of Government, of course) and this formed a kind of 'conducted tour'. Later on what were called Field Days were arranged as part of the annual meetings of the Agricultural and Experimental Union, which were held on the farm. In recent years the 'conducted tour' idea has been much adopted and selected visitors from the several districts have been taken round on an instructional trip to the different farms in turn. All this may be looked upon as 'spoon feeding' but in the beginning it was quite necessary and even now the need continues and they serve an important purpose. They have been and are the means of spreading a correct knowledge of new methods and ideas and of the work of the department on these farms over large sections and strata of the people.

Specific encouragement to those taking up improvements.— The aim and object of all these different methods of popularisation or extension is to see that the improved practices are adopted in the villages and that they spread in ever-increasing measure in the countryside. The question arises whether some tangible form of encouragement cannot be granted, which will induce them to come forward to take up the work and thereby speed up the progress. Such specific incentives comprise generally the following, *viz.*, (1) supply of manures and seeds free of cost, (2) the sale of these and of implements at concession rates, (3) or, on credit, (4) a subsidy or money grant at the end of the season which will bear some relation to the nature of the work undertaken and the area covered, (5) an undertaking to make up any loss that may be incurred if the new practice should result in such loss, (6) other incentives like the grant of certificates, medals, prizes and similar tokens of public appreciation.

In the early years however and for a long time thereafter, we steered clear of such aids and depended upon the

merits of the methods, and the willingness of the people, setting our face sternly against free gifts and other artificial stimulus. At every meeting I addressed, I made it a point to impress upon the leading agriculturists that they should really 'lead' in such matters and set an example to their brethren, and that it was their duty to do so as much as it was an honour to be a leader, a kind of "noblesse oblige" or as the *Gita* says 'Whatever the leaders adopt as the best course, that the common people regard as the correct one and follow'. The results on the whole justified the procedure and I must say, considering the very small almost negligible staff of those days, the extent of successful work accomplished was surprisingly large. Even later on when some concessions began to be granted, the main and by far the largest stimulus was the desire and willingness of the people and not the inducement of a money grant—all credit to their good sense and self-respect I may add that as long as I had anything to do in these matters, I systematically discouraged the tendency on the part of some people to make this kind of co-operation on their part a doorway or qualification for political opportunities, so that the work may be done for its own sake and not for any extraneous advantages. I may have been wrong perhaps, I cannot say. Still from a cold severely practical point of view, these measures of tangible encouragement have their advantages, so I shall say a few words about each of them.

The free supply of seeds and manures was adopted for a special purpose, *viz.*, where a client was agreeable to carry out trials in a systematic manner according to a plan laid out by the department involving the regular keeping of notes, and the correct weighment of the yields on the individual plots. Of course the labour involved in this work was far greater than the value of the seeds or manure supplied, but it was considered of some help at least. The quantities given were very small being about enough for a quarter acre. This plan was adopted, moreover, only in the case of the members of the Agricultural and Experimental Union who

come in a special class, because they understand and fully realise that it was somewhat experimental, and though well tested on the farms were not free from a remote chance of failure, due to accidental causes like poor rainfall, disease and the like. They were taking up the work despite this risk, because if successful it would be the means of the practice being taken up by a large number of their neighbours. There is much scope for this sort of help ; indeed help in a more liberal measure is well worth affording.

2. The sale of improved implements, mainly ploughs, seeds and manure at concession rates or on credit is a favourite form of aid, and latterly much sought after too. It satisfies the purchaser because he feels he is not receiving a free gift but is paying for what he gets and it satisfies Government because they are able to speed up progress without incurring much loss. The snag however is that it encourages a spirit of dependence on Government to the extent of making such help the deciding factor, a case of Government aid or nothing doing. As Chairman of the Agricultural Committee for some years, especially when money began to flow somewhat freely, I met this attitude on the part of some members full blast, there being practically no limit to the concessions asked for; but it was money well spent and the concessions really proved very fruitful of results.

3. The sale on credit is also much favoured, perhaps more by the recipients; but of the two, the outright sale is to be preferred, even if it may involve a big concession. I have bitter memories of the troubles incidental to this credit sale form of encouragement. At one stage in the early days, in order to encourage the use of oilcake as manure for sugarcane, a scheme of supplying it to cane growers was started, under which it was sold to them on credit, the cost being recoverable after a year, at the close of milling when they could easily repay it out of the sale proceeds of the jaggery. It was a state-wide scheme and involved a big outlay (for those days, nowadays it will not be considered worth looking at) although at this distance of time I cannot

give figures. All went merry as a marriage bell and the sales were brisk. The trouble came however when the repayment fell due at the end of the year; collection became difficult, the period had to be extended, the time of the Agricultural Inspectors (Extension Officers) was wasted in the fruitless attempts, and they became the most unwelcome of visitors, a sort of bill collectors far from being received heartily as a helpful guide as they used to be. The subject of oilcake arrears became a standing sore in the department, into which both Government and the audit department did not hesitate to prod. Many of the defaulters were men of influence too, and I doubt if the subordinate staff (or the higher up's for that matter) could make bold to be disagreeable to them. Even after the lapse of many years I doubt if the amounts were collected in full, probably substantial sums had to be written off. A sad feature or result of the scheme was the temptation it offered to the small paid, much-harried, weak-willed men among the Inspectors to misappropriate the collection in some cases, and I am grieved to say one or two of them came to grief over it. I mention these things, because I am afraid they will repeat themselves, should similar schemes be started again, as indeed appears quite likely. It would be much better in many ways to sell the materials outright, at a big concession, if necessary, rather than face all these long-drawn difficulties, including a final write-off perhaps. If however the system of procurement continues the collection may be easy; otherwise considerable pressure will have to be exercised and even then a goodly sum will have to be written off.

4. The grant of a subsidy was a system instituted in connection with obtaining large supplies of the seed of improved varieties, mainly rice and ragi, and was made to farmers who undertook to grow such crops from pure seed furnished by the department, and to sell the produce back to the department. The demand for such seeds has grown rapidly (a measure incidentally of the appreciation of the work of the department), and in the last few years to

unmanageable dimensions, it is stated. These seed farms can be expected to meet a good portion of this demand if not the whole of it. For this purpose the crop has to be grown pure, any mixture noticed during growth has to be removed, or 'rogued out', the crop has to be harvested, stacked and threshed separately and carefully, all of which entail a good deal of labour and time, not to speak of a cheerful willingness on the part of the grower.

The matter of seed supply is always attended with a certain amount of risk, and despite all the care exercised, one does come a cropper occasionally. It may not be always due to faulty seed; for instance, a man was given a rainy season variety of rice for being grown in that season but he kept it and later sowed it in the hot weather, with the result that the growing period was abnormally prolonged; to another sugarcane setts were supplied and although it was not an 'arrowing' (flowering) variety, in that particular case, it arrowed profusely to the great disappointment of every one; in another case American cotton grown from seed supplied by the department suffered from the leaf and boll shedding disease to which this type of cotton is much subject. Of course they all yielded a full crop of complaints, which the department had to reap. These were in the old days and the quantities concerned were very small. Even very recently (1953) seed ragi was supplied by the department on a large scale, the crop failed, and it was alleged that the seed was defective; a press note was issued by the department refuting the allegation and much oil had to be thrown to allay the trouble, in spite of the fact that the seed was sound and of good quality. The department has a lively time trying to dodge the brickbats on the occasions of such 'mishaps', and no amount of care therefore will be too much to see that first-rate seed alone is supplied. This course will be possible only by running a number of seed farms in different parts of the country, through the agency and co-operation of private growers. A substantial subsidy in the shape of a special grant or a good premium

in the price or both, will be indispensable to facilitate the work. This will certainly form a permanent and growing line of activity for the departments in all parts of India.

5. The next kind of aid seeks to make good any loss which the grower may incur in case the trial or experiment he undertakes on the advice of the department becomes a failure. This appears quite a business-like arrangement and occurs naturally to many minds and is expected to appeal strongly enough to growers to induce them to take up such work with readiness. On the other hand, however, it does not appear to do so, and I do not know of anyone who has come forward on the basis. It must be said to the credit of our agriculturists that they have cold-shouldered it as savouring too much of a tradesman's mentality. I am referring to it really for its historical value, if I may call it so, because in go-ahead Mysore it is a very old idea. There is a Government Order passed about the year 1904 or 1905 (I speak from memory), *i.e.*, some fifty years ago, which sanctions this particular method of inducing ryots to take up improved practices. The department had hardly begun its work at the time; there were no improved practices to recommend, and there was no staff to initiate and supervise the work. Naturally the order has remained a dead letter with not even a memory surviving.

6. The next form of aid, *viz.*, that of public recognition in one or other of the ways specified, has everything to be said in its favour and will be found the most serviceable one at the present time as in the past. The men deserving of such recognition in the field of agricultural improvements are as a rule those who seek no publicity and the work they may be carrying out as pioneers in their villages does not meet the public eye. They are so alert and open to new ideas, that the improvements have only to be suggested and they would take them up promptly. Pumps, engines, improved sugarcane mills and furnaces, several new varieties of sugarcane, rice or ragi, the use of artificial manures, improved ploughs and other implements, in fact whatever may be recommended

would be given a trial on their farms, which were as interesting as Government farms; and yet they were quite inconspicuous people, often afraid of approaching officials. We have had a good number of such excellent agriculturists, large farmers and small, old and young, and both men and women. This is the very kind of work which needs to be strikingly brought to the notice of fellow agriculturists and the public in general, so that it may induce others to do likewise if not go one better. A public recognition or honour done to them straightaway opens the eyes of others to the possibility of similar work. This form of aid therefore is an important one. The recent crop yield competitions started both on an all-India and on a provincial basis, and the award of handsome money prizes and titles sometimes at the hands directly of the President or Prime Minister, which have produced astonishing results like 12,000 lb. of paddy per acre, 5,900 lb. of wheat, and 753 mds. of potatoes all of them undreamt of before, set the seal of approval on this method.

As this is by no means new in Mysore, where a variety of forms of public appreciation have been adopted in the past, a few words about them may be found interesting. It was the practice in Mysore for H. H. the Maharaja to confer titles of different grades along with costly jewelled necklaces and other gifts as insignia of the orders to men of eminence among officials and others who may have rendered meritorious service to the people of the State in different walks of life. The recipients were very select and I do not know if any one in the sphere of agriculture such as I have described ever figured in this exalted company. There was however instituted later on a somewhat lower grade of recognition, which comprised the award of public service medals, also at the hands of H. H. the Maharaja. A good-sized gold medal and a pair of costly shawls were the gifts bestowed. Many philanthropists who had built hospitals, school buildings, or endowed other forms of public charity and usefulness, and pioneers in the field of

economic development, and a good number of worthy agricultural leaders figured among this class of men honoured by their king. The awards were made either in open durbar or in cases where this was not possible by the Deputy Commissioners in the districts. As far as the agricultural recipients were concerned, the names were those recommended by the head of the department. I said that these men were not always of any conspicuous importance and I recall an instance which spotlights this fact. In this instance the recipient whose name I had submitted to the Director, though he had done work of outstanding importance in respect of agricultural improvements, was too insignificant a person to be known to the Deputy Commissioner of the district, at whose hands he was to receive the honour. This was rather embarrassing to this officer on this occasion because he is generelly believed to know everything in his district, and I felt I had dropped a brick pretty badly.

7. On a much lower level may be mentioned the award of medals, prizes and certificates to winners in crop competitions. This was organised in connection with the introduction into general cultivation of an improved variety of ragi—the H 22—which was new at the time, though it has now displaced the local variety completely, all over the eastern districts of the State. Those who had grown the best crops, free from mixtures and judged by the appearance of the crop on the field before harvest by judges consisting of a few leaders in the villages, were presented with silver medals of two classes, along with a certificate. The presentation was made at the annual district conferences which used to be held regularly in those years as part of the Economic Conference activities, which were largely attended, presided over by the Head of the district and had a certain amount of ceremonial and festive appearance about them. The prize winners no doubt attracted general attention, and their neighbours sat up and took notice, and a spirit of competition resulted, all of which tended to the further extension in the cultivation of the variety. I may

add that later on, the prizes were awarded in the shape of bags of ammonium sulphate manure, in two sizes of 20 and 10 lb. or so; this was with a view to popularising the use of this manure—which is now sold in thousands of tons (being nearly 4,000 tons in 1951 in Mysore)—but which was new at that time and was looked upon with much hesitation and some fear. It was in fact an attempt to kill two birds with one stone. I have given these instances to show that Mysore adopted this particular form of encouragement quite early in its extension campaign with success and that it deserves a prominent place among the methods to be adopted at the present time also.

How to Establish Contacts

The essence of district work (Extension) is to get people to take up the improvements recommended, at least on a small experimental scale and to give them a trial on their land. If the improvements are well-tested ones and reasonably sure to be superior to the old ones and applicable to the local conditions, that is to say if they are *really* improvements, then it is expected that both the person undertaking the improvement and his neighbours who may witness it will be so impressed that the former would continue and extend it and the latter would take it up too. To establish contacts with the persons concerned, *i.e.*, the actual cultivators and landlords, so that they may be persuaded through the talks and demonstrations to which we have referred, is a first requisite, but the means of securing such contacts in the beginning may not be easy. How these can be secured, and once secured how the connection can be cultivated and improved may be briefly described.

It is well to remember that by himself the agricultural officer is a nobody; he has no particular official position or prestige, such at any rate as the ryots understand it; he has no authority of any kind, he cannot go into a village and summon a few people, to whom he can talk and explain his work, even the village headman may ignore him and make

himself scarce. He will have to depend upon his resourcefulness, his ability to strike up an acquaintance with the prominent people in the village, the village schoolmaster, the Secretary of the local co-operative society and so on, to get a foot-hold so to speak. I have had a few such experiences in the early days, when I had no staff, and had to work by myself, often feeling like a lost soul; it is not a pleasant experience by any means and certainly not conducive to bring out the best in one. Later on, when the department expanded I was particular that my staff should be spared this experience and I designed an effective method, to which I shall refer later on.

The Deputy Commissioner and the Revenue Officers.— As a rule however in those days I was more or less under the protecting wings of the local Revenue Officers, generally the Amildars, who took upon themselves the responsibility of arranging for my meeting important agriculturists both at formal meetings in the taluk headquarters and in typical villages; in fact they were always keen on making the best use of my tours. Of course as time went on and the department developed and work expanded I thought it was not fair nor necessary to indent or depend so much upon their help and more or less, dropped the pilot very soon. The role of the Revenue Department is however so important in this work and so indispensable, one may say, and continues to do so now as it did then, despite the momentous changes that have taken place in administrative methods, that I should like, before proceeding further to refer in some detail to some aspects of their invaluable co-operation.

The Revenue Department in the districts is the most pervasive Government agency; the Deputy Commissioner (or his counterparts elsewhere) in the Mysore State, and his subordinate officers in charge of subdivisions or taluks are in virtual control of all the administrative departments within the district, each within his jurisdiction. He has always wielded extensive powers, which impinge upon practically every aspect of the life of the people, and his is the

responsibility not only for the collection of the revenues and for the maintenance of law and order but also for the health and happiness of the people, for their moral and material well-being, for their economic development and indeed for all the elements which constitute a welfare state. He has naturally been vested with the necessary powers for the purpose and his influence pervades every sphere of the people's activities, like the very air they breathe. He is looked upon as their *mabap*, and whether feared or loved he is always obeyed.

Great works of public utility have in the past been carried out by them mainly through their influence; miles and miles of stately flourishing avenue trees of tamarind and *hongé* seen in some districts in the State are said to be the work of enthusiastic Amildars and their sympathetic superiors. Tanks, drinking water wells, many beautiful step wells (*kalyanis*), topes, school buildings, hospitals, chattrams, dharmasalas and other public benefactions are also the result of their persuasive influence on wealthy communities and individuals. Renovation of temples, the construction of new temples, the institutions of jatras and cattle fairs in connection with many of them, new extensions to towns and villages, and well laid out straight streets therein, can also be pointed to as the result of their keenness and influence. Some have even ridden their pet hobbies although not always with success. One Deputy Commissioner was red hot upon grain stores, another on tree planting, another was keen on providing all dispensaries with midwives, and still another on night schools; another set his heart upon Jewish latrines and was never tired of hammering on the subject at his 'jamabandi' gatherings. Yet another's hobby was the use of donkeys or single bullocks for ploughing, for which he designed a suitable yoke; another worked hard to breed out black sheep (four-footed ones) and to have only white sheep in the State; others fancied special crops like potatoes and English vegetables and one Amildar even introduced the cultivation of buckwheat as his contribution to

the economic wealth of the State. All these had some measure of success, at least as long as the particular officer remained at his post.

Things have however changed, they have been gradually divested of many of their powers one after the other, and both powers and duties have devolved in many cases on non-official shoulders. Their opportunities and scope for such work have therefore largely shrunk, but the force of century-old tradition cannot easily wear off, and shorn as they are of their one-time extensive authority, they are still a great power, and I should strongly emphasise their being utilised as a very important agency for economic development, such as is comprised in the Extension and Community project schemes.

Coming back to the subject of the meetings which I was enabled to attend and address, they comprised some which were specially convened, but generally they were the meetings of the District Boards, District or Taluk Development or Progress Committees of the Economic Conference, the 'jamabandies' of the Deputy Commissioners, and meetings at 'jathras' and cattle fairs. All these were great opportunities for getting into touch with leading agriculturists and the ryot population in general and I made the fullest use of them. In the talks themselves, the various new practices or improvements which were recommended to be taken up were explained as convincingly as possible with the aid of the demonstrations to which I have already referrred: their refrain always was that the leaders should come forward to adopt them on their lands, and the finale was a request for their names and the particular item of improvement which each proposed to take up, which was generally complied with cheerfully. Humorous happenings did turn up occasionally. The request for the names was almost like handing round a subscription list, and a certain amount of gloom descended on the meeting at this stage in the proceedings. Still, there were many 'yes' men in the audience and with the eye of the boss over them, they came forward eagerly enough. Some

would have an improved plough, some would take a bag or two of oilcake manure, some a bag of sunnhemp seeds, for sowing for green manure, others would take up other items and so on. If the requisite readiness was not forthcoming, then the Chairman of the meeting took a hand and called out the names himself, to which the response was prompt enough; there were however pleadings to be let off easy, for reasons which at that time I was not able to understand. For instance, the seasons had been bad for years and the village was in a bad plight, or that the village had already to bear more than one levy, or that the village was a road-side one and subject to frequent official visits and so on! Both the people and their chief apparently thought that the Government was out to sell these new materials, as in the good old days when the rulers did some trading on their own. Old memories die hard, and I was getting gradually educated to the situation. But apart from these rather curious and humorous episodes, much good did come out of these contacts and a good many co-operators or clients, as I used to call them, for the department were secured even at that start as the result of these meetings.

The Co-operative Societies.—The next body with whom fruitful contacts could be established are the co-operative societies. In the early days the propaganda for establishing new societies and improving the older ones coincided with the beginning of the Extension activities of the agricultural department, and I took full advantage of this opportunity. One great point in their favour was that they were spread all over the country and therefore afforded the chance to cover many different kinds of agricultural conditions. At the general meetings of many of them, whether rural or urban, at the conferences in the district or taluk headquarters which were held once a year and which were attended by members from many societies, talks on agricultural improvements were regular features, especially such of the improvements as were suitable for being taken up by co-operative societies. This early connection was assiduously and continuously

cultivated, until the societies were developed into very popular sale depots for improved implements, seeds and manures, in which many of them were able to do a respectable volume of business. The hiring out and sale of improved sugarcane mills and boiling pans was a particularly profitable and popular line, and a good number of these outfits were sold through the societies. Speaking for myself, it was one of my oldest spheres of activity in the State, the very first co-operative society registered as No. 1 having been started by a handful of enthusiasts of whom I was one and later on, my being connected as Founder-President, Vice-President or other office-holder of more than one type of society. The point to note in this connection is however that these contacts are very valuable for an Extension officer, afford a means of increasing his clientele and should be taken full advantage of. The members may undertake improvements themselves on their own land or may be instrumental in inducing others in their villages to take them up. At every visit to any village the Extension Officer can, with advantage, and indeed, ought to, step into the local co-operative society if there should be one and meet as many members as he can.

Agricultural Associations.—Sometimes there may be an agricultural association at the district level, which will afford very good scope for the securing of such contacts. At one time there were a good few of such associations, but nearly all of them were only in name; they met occasionally but suffered from a chronic lack of any definite work to do, which is probably the main reason for their disappearance without being missed. The members were however very genuinely interested and would eagerly welcome help and guidance. There was one such association in Chitaldrug when I began district work and the members were most cordial and enthusiastic; I found their co-operation was of invaluable help to me not only then but in later years also. No Extension Officer should miss the opportunity of contacting them and seeking their help. It is possible that such associations may

again come into existence, and it will be up to these officers to help and develop them to their mutual advantage.

The Mysore Agricultural and Experimental Union.— Though the associations of the old type have passed away, a very live organisation has taken their place, and is now an important body with a very large membership and with a number of branches in the taluks all over the State affiliated to the central body. This organisation called the Mysore Agricultural and Experimental Union owes its existence and its present flourishing condition to the foundation laid by Dr. Leslie C. Coleman, the Director of Agriculture in Mysore who presided over the department for well nigh a quarter of a century and to whom mainly belongs the fine record of work of this department in many important directions. He chalked out the lines of work of the Union (said to be on the Canadian model) which distinguish it from its predecessors and have contributed to its vitality. He suggested it as the duty of every member to carry out some experimental or field trials, which were a necessary part of, and formed one definite stage in, the work of passing on the results of scientific work on the farms to the ordina y cultivator. I have already referred to the slight and remote element of risk due to seasonal or other causes inseparable from the best of recommendations, which can be understood and allowed for only by a special and select type of agriculturists, and it is of these that the Union is composed. They have been the main instruments in these intermediate tests of new varieties of sugarcane, rice, ragi and groundnuts, of the manurial doses recommended for the main crops, of the many trials of the design in improved ploughs, which finally resulted in the '*Mysore Plough*' and several other matters of the same kind. It should not be understood that all members came up to expectations, indeed the Union was many times in the doldrums and was in serious jeopardy of floundering, but this element of vitality has helped it to survive and flourish. In the very large number of members al over the State in its present condition, the Extension

staff has now more than enough help in securing and widening contacts.

A word may be said also about *individual* contacts, especially with the leaders, who are nearly all politicians and represent the different parts of the State in the Legislature. In the new democratic form of Government they wield great power and are capable of advancing the cause of agriculture in the State, and with their intimate acquaintance with the needs of the agriculturists, of rendering signal service to them. It needs hardly to be emphasised therefore that the Extension staff should contact them in their villages and seek their co-operation and help; as a matter of fact it may be made a grievance if these officers do not do so. It may be that they are absentee landlords or have their lands cultivated by tenants and do not therefore have that direct interest in their land which is necessary for practical co-operation in the manner one would expect, but that should not deter or discourage the staff from seeking their contact and help. A warning however may not be out of place, that the staff should be strictly on their guard against straying from their duties into any ultra-departmental activities detrimental to the interests of the department or their own and land themselves in trouble. *Verb. sap.*

The contacts established through one or other of these agencies as described above can help one only with a start, but once the push is given and one is fairly launched, one will have to sail under his own steam, so to speak, and the degree and rate of progress will depend entirely upon his knowledge, tact and ability.

Village Meetings.—Although the meetings of the different descriptions which we have spoken about so far, no doubt serve a useful purpose in many ways, they cannot be compared with talks at village gatherings. The former are held mostly in the district or taluk headquarters and the audience generally consists of people who are not directly connected with agriculture. There may be a large proportion of officials, lawyers, schoolmasters, merchants and perhaps students

and the like among them, to whom these talks seldom make a direct appeal, although they may evince an intelligent interest. At the jatra gatherings, jamabandies, etc., although people may be largely if not entirely agriculturists and not the 'high brow' class, their interest for the moment is different, being just the enjoyment of the festival, shopping, cattle trade, worship at the temple, and the fulfilling of vows, sight seeing and so on; or they may be preoccupied and worried with the matters which they may have come to represent, or may be called upon to explain, to the Deputy Commissioner or other officer. In the result they are in no mood to be dosed up with this kind of talk and such interest as they may show may be only make-believe or lukewarm at best.

On the other hand out in the villages you meet men who are practical agriculturists, the real man behind the plough, whose daily concern is agriculture, right in the middle of his daily work, and every word you may say makes a direct appeal. They will not be passive silent listeners either, but may argue, contradict, raise difficulties and objections in your recommendations and can assess them at their correct value as far as their own conditions are concerned; one really comes down to brass tacks at this level. This sort of active participation and argument is really more stimulating and fruitful than the respectful silence amounting to ignoring one, it enables one to clarify matters, to answer objections and is helpful in convincing them more strongly than otherwise. Moreover one gets an opportunity to understand the limitations of some of these recommendations and to qualify and adapt them suitably where necessary. For instance, is it the use of oilcake or sulphate of ammonia you are speaking about as manure for sugarcane? Then they will argue that these require copious irrigation, that their supply of water from the tank is not dependable, or that the lifting becomes more laborious or costly (in the case of well irrigation), or that they grow the cane under almost non-irrigated conditions, as they do with the variety

called 'cheni' or 'marakabbu'. Is it a new high yielding variety of cane you are recommending? Then their objection is that it is hard-rinded and makes it more difficult to mill. Is it the growing of sannhemp you are recommending? Then they will urge that the crop will be grazed down by stray cattle unless they fence the field or watch it. Is it the stone threshing roller you want to be introduced? Then they will say that the straw is not softened enough for the cattle to eat without waste or that some grains get broken and so on and so forth, in the case of nearly every one of the new practices advocated. It is interesting to observe that all these new practices have been taken up so largely or almost universally since then that they are no longer regarded as anything new and the old objections are not even remembered.

These village meetings and talks always result in securing quite a few clients undertaking to carry out one or other of the suggestions and therefore facilitate future visits and create the feeling that a familiar friend has arrived. Such visits should indeed be regularly paid, not only to interest more villagers but also to look into the results of the previous visit, to smoothen difficulties, to answer questions and so on. Sometimes an irate aggrieved client will have to be faced, as it happened once; at a somewhat later stage of my work it was decided to distribute cross-bred Merino rams as part of the attempt to improve the wool quality of the local sheep and a fine specimen of a ram lamb had been given to a villager. What should be my astonishment when some months afterwards I visited the village and met the client looking angrily at me and demanding that the ram be forthwith removed or he be allowed to cut its throat and make mutton of it! The fact was that the lamb had developed into a most pugnacious brute with a murderous looking pair of horns and was trying to butt into every one, as a sort of practice for a serious bout, perhaps. Needless to say the ram was taken back and as far as that village was concerned this ram business came to an end. In the earlier

years unexpected discoveries of a similar if somewhat less formidable kind were come across such as that a bag of oil-cake or other new manure taken by one was kept unused or a quantity of sannhemp seed or superior variety of ragi was likewise kept carefully stowed away, because the men could not muster enough courage to use them, or strangely enough that the womenfolk had prevented them from so doing. It is not at all unusual, though it may not be generally known, that the women have the deciding voice in many cases and if the seed had been sown or the manure used without their consent the men had a rough time. These village visits, incidentally give one a chance to explain things to the womenfolk also and enlist their co-operation, which is unthinkable in the case of the meetings at a higher level.

Clients Ledgers.—Reference has already been made to the difficulty of Extension Officers who have to visit villages entirely as strangers and representing a somewhat novel and unfamiliar department of Government. In order to mitigate this difficulty I adopted the plan from the beginning of keeping what I called a "clients ledger". This ledger was to contain a villagewar list of the persons who may have taken up one or other of the departmental recommendations, such as using an improved plough or cultivator, the threshing roller, a new cane mill, or sown any of the new varieties of crops, or sannhemp, green manure, or used oilcake or ammonium sulphate, or carried out the salt water selection of rice or ragi and so on. The book contained both the name of the client and the details of the work undertaken by him. As more clients were secured in these villages and as more villages were visited with like results, the list was added to then and there systematically, so that when visiting a village one had only to look up the list and call on the client or clients listed. This made the visit really business-like and proved very helpful and one did not quite feel like a lost soul. I prescribed not only a large comprehensive register for being kept in the office which would contain all details

of each visit paid, but also a pocket book containing only the names and the kind of work undertaken. Any newly appointed officer who would be a stranger to his charge had only to carry his pocket book of clients with him and look up the clients in the particular village he was visiting. The usefulness of such a book can be appreciated only by those officers whose path was smoothened for them by this method. I do not know if the practice is still continuing; it is possible that the number has increased so largely as to outgrow the limits of such registers, or to need any such aids at all; but even then it is worthwhile continuing it as an interesting record. For one thing I know how pleased particular clients feel when they see that their work has been recorded in that way. In the earlier stages the method was of invaluable help; in a manner, it greased the wheels. This is not a small asset to a department like that of agriculture, with no favours to give that any one has to work for, nor any power which anyone need fear, and which depends for its success solely on the willing co-operation of the villagers based on the tact and suavity of the staff and the soundness of the advice given.

Exhibitions and Shows.—The exhibitions, fairs and shows organised by Governments and private bodies on special occasions afford a very good opportunity for the departments to get into touch with the people, and as a vehicle for propaganda and popularisation are probably unique. In the Mysore State, the Dasara Exhibition is an annual function and has been so for over 40 years. It is organised on a large and elaborate scale and the agricultural section has always formed a remarkably attractive and instructive section. In addition to the indoor section a special feature has been a regular farm—at one time quite 4 acres in extent—adjoining the exhibition building, a feature which is still being continued though on a reduced scale. Many new crops and varieties are raised, manurial experiments demonstrated on growing crops, wide planting of sugarcane or cotton, economic transplanting of rice, and

other methods recommended by the department are demonstrated, model cattle stalls, manure pits, compost making are all arranged for, and work really goes on during the whole crop season so as to be brought to the correct exhibition stage at Dasara time. Open areas are reserved for holding ploughing and other tillage demonstrations including the work of tractors and tractor drawn implements and so on. Many operations actually in progress are put on view such as jaggery boiling and sugarcane milling by improved methods, chaff cutting, threshing, winnowing by machinery, cream separation and butter making and so on. In some years elaborate tableaux have been got up, and features like "all about sugarcane," "all about ragi," or rice, or groundnuts and so on, covering every aspect of the cultivation, especially the improvements, used to be arranged. In fact the amount of ingenuity shown in this respect by all sections of the department is remarkable; in one year a clever exhibit was a cascade suitably illuminated of ragi grains, which was to draw attention to the department's work on ragi. After all, the fact that it is an "exhibition" should not be forgotten and the exhibits have to be impressive, 'hitting one in the face' so to speak, and compelling curiosity and interest on the part of the visitors. The department has gone to great lengths in getting up these shows and it may be almost impossible to excel what has been and is being done. The danger is that enthusiasm may wane and the monotonous yearly round create a tired or frustrated feeling which should be guarded against, especially in view of the many exhibitions started in different parts of the State in which the agricultural department has to co-operate actively.

So much time and work are expended by the department in connection with these exhibitions that one wonders sometimes if the results are commensurate at all with the efforts. A large majority of visitors are mere sight-seers, do a bit of shopping and generally enjoy themselves, and a look into the agricultural stalls is a sort of half-hearted affair.

One's expository eloquence, be the subject ever so interesting or important and however much the tongue-clattering, falls on deaf ears, the crowd just passes along and takes little notice. Of course interested visitors, though few and far between, do look in and carefully listen and observe, but this only sets off the general indifference. One has to be on one's guard against the disappointment and the cold douche, and it will be well to change the personnel in charge now and then lest they become too blasé. It must be said however that things have greatly changed and there is a growing interest and understanding on the part of the public and the popularity of the section is steadily and markedly increasing.

Occasionally there are special crop shows for particular single crops like groundnuts, potatoes or cocoanuts which are held in the tracts concerned; all three which I started and conducted in my time, although small, compared with the grand Dasara Exhibition, evoked much interest from the growers and probably proved more directly useful. It may be desirable to revive them.

On the whole it may not be possible to improve the present methods to any great extent; popular interest is growing and it behoves the department to make the fullest use of these large gatherings, by the many methods noted above in which the staff have become almost experts.

Speeding up Improvements and the Rôle of Compulsion

The methods by which farmers may be made to adopt the various improved practices, which we have described so far and which will have to be continued more or less on the same lines, albeit in an intensified tempo comprise only one principle, *viz.*, that of persuasion. It is as aids to that principle that the various forms of demonstration on the government farms, private holdings or special areas, the various ways of bringing them to their attention through books, pamphlets, newspapers, etc., and through the medium

of set lectures, village talks and individual appeals have been and are being resorted to. Despite the most enthusiastic and persistent efforts, the rate of progress can be only very slow and in fact disproportionately so, considering the human effort expended. The peculiarity of agriculture, in contrast with other spheres of extension activities, *viz.*, that if an improvement cannot be taken up in one year we have to wait another full year when alone with the return of the due season, it can be thought of, makes the pace much slower than it would otherwise be.

The question must occur to many whether it will not be possible to hasten this progress, whether some means cannot be devised under which farmers will adopt these improvements as soon as they are demonstrated to them, instead of its being left to be decided by them in the course of years at their sweet will and pleasure, with the possibility of their not adopting it at all. In other words, cannot some form of compulsion, by either official influence or with regular legislative sanction or any less drastic measure, be resorted to in order to see that as large a number of them as possible, if not all of them, adopt these? In fact in the early days of my extension work, a few revenue officers of authority have raised this point and have offered to see that a large number of the ryots in their taluks or districts take up these improvements, and that it would not be difficult at all to use their influence in securing this end. Their suggestion was the result as much of their faith in the merit of the improvement as their concern over the futility of my efforts and the requests and persuasive appeals made with missionary zeal, a situation which their tradition as executive officers thoroughly disapproved and almost rebelled against. Elsewhere too, this matter of compulsion has been mooted in this connection, as may be seen by the reference to it in "The Village A.B.C." by F. L. Brayne. Many of them must also have had in mind the large volume of village improvement or other work turned out by them by the exercise of official influence used to supplement what was

ostensibly put down as sweetly reasonable pursuasion to enlist the voluntary participation of the people. It was quite possible that many more people could be enlisted as the result of this method, but the consequences to the work of extension in those early days would have been serious. Not only would a spirit of antagonism be set up where hearty co-operation based on enlightened self-interest was most essential for the progress of the work, but any error of judgment or the risk of failure due to various causes which have already been referred to, would be fatal to the movement and would result in a set-back from which it would be difficult to recover. Furthermore it is doubtful if the improvements would actually come into operation, even if the first step should be taken at official behest. A few individuals, may, for example, buy improved ploughs or other implements, take a few bags of the new manure or even of the seeds of new crops or varieties, but there would be no certainty that they would be actually worked or used for the purpose intended. It would be a case of "You can take the horse to water but you cannot make him drink" so that even from the point of view of getting the improvements adopted it may fail in its purpose. The method was therefore quite out of the question.

Much water has flowed under the bridge since those early days and it is a question for consideration whether under the altered conditions there may not be any scope for adopting it in some form or other. A few observations seem appropriate, and in making them I hope I shall not be misunderstood. For example, let us take the case of the recent introduction of the so-called Japanese method of rice cultivation. All accounts go to show that yields amounting to two or three times the usual yield of paddy have been obtained by the method. Where about 20 pallas of paddy would be considered a maximum or a very high yield, reports say that yields of over 60 pallas an acre and ranging from 30 to 40 pallas as lower limits have been obtained. Now, if these are really correct and reliable (one

presumes they are, in spite of some old-fashioned scepticism) the production under this new method if adopted over wide areas, if not on the whole of the paddy tracts of the State, will be staggering in its magnitude; people may not indeed know what to do with so much rice ! The increase in the money return to the farmer and the resulting general prosperity of the country will be wonderful and the method may indeed prove a veritable Aladin's Lamp. If the exercise of some form of compulsion is called for to see that the method is adopted universally and quickly, is it not worthy of consideration ? If again a new variety of any crop like sugarcane, paddy, cotton, etc., should yield very much more than others and have additional merits such as resistance to disease and so on, is it right that people should be allowed to continue to grow the older ones? The same applies to the new manures. Take again the measures necessary to control diseases and pests; if efficient and practicable methods of control are known, will it not be right to see that it is adopted by every grower in time in the interests of both himself and of his fellow growers?

Compulsion no doubt is an obnoxious method, even at best. The very mention of it will "put one's back up" and may drive even those who may be otherwise agreeable, to take up a hostile attitude, and to that extent defeat itself. But compulsion can take many forms. It may be so exercised that the edge is taken off, so to speak, and people do not feel it as such. At every step in one's life as a citizen, one has to submit to various restrictions to one's freedom whether it be to do particular acts in a particular way or to avoid doing certain others and in a particular way, and these have become so familiar that one does not even recognise them as impediments or irksome interference with one's freedom to do as he likes. On many a special occasion especially in respect of the prevention of the spread of disease we easily submit to be herded and regimented and put through forms of procedure which should ordinarily be considered most irksome restraints.

Compulsion may be a sort of *quid pro quo* as in the case of pilgrims or visitors to temple festivals or jathras in places where cholera may be prevalent, who will be allowed to proceed only if they get themselves inoculated against the disease. Agriculturally, the following notable instance of such a method which took place in Mysore may be cited. When the Mysore Sugar Factory was started, it was deemed necessary that the cultivation of sugarcane should be carried out in the best manner and should embody all the improvements recommended by the department as the result of their many years' experiments. Thus the land was to be prepared by improved ploughs and cultivators, the cane to be planted was a particular variety (H.M. 320) and none else, the canes were to be planted wide in three feet rows, compost manure, oilcake, ammonium sulphate and others were to be used in doses and stages according to departmental instructions. Now, these had been attempted to be popularised for many years in the sugarcane growing villages of the State but with only the tardy and driblet scale results with which one is familiar. On the other hand in the Mandya area as part of this campaign these methods were adopted in the very first year and by every grower, because the sale of cane to the factory which was a much prized privilege was made conditional upon the growers adopting these improvements. There was no compulsion as it is ordinarily understood, no policing, no penalties; compulsion was as a matter of fact not only shorn of its ugly features but was made so attractive as not to be made out as such and as fit to be welcomed and hugged. To the same category belongs the cultivation of Virginia cigarette tobacco; here too every grower has to grow this particular variety and strain of this tobacco only; in fact the seedlings are raised by the tobacco curing company itself and supplied to growers; the cultivation has to be according to the company's methods which are usually supervised by its staff. The picking and supply of leaves has to be in the order prescribed. All these conditions are willingly adopted, as a *quid pro quo* for the privilege of selling

the leaves to the company who flue-cure the leaves in their own barns and convert them into a saleable commodity fit for manufacture or export. In both cases it may be made easier for growers (of sugarcane or tobacco) to adopt the improved methods by an advance of money, which can be easily recovered out of the sale proceeds due to them, when they sell the produce to the company; the working of what may be called compulsion is thus made smooth and advantageous to both parties.

Another way of making compulsion acceptable, is to make use of what may be called the herd mentality in people. It often happens that the novelty of some of these methods itself acts as a bar to their adoption and there is a general disinclination to go in for them based on the fear as to the result or as to their suitability in other respects. The bulk of the people even when convinced, would simply say or have you understand 'let the other fellow do it first'. An English missionary friend of mine who introduced a large number of improved ploughs in his parishes used to say that the chief requirement was to see that some one took the plunge, to make a few men by persuasion, influence or a money advance adopt the practice; and the rest usually followed without much ado.

This is especially so in the case of new varieties of crops. When many years ago the short season groundnut, Small Japan and Spanish, both erect varieties easy to harvest were being introduced, all that was necessary was to see that one or two cultivators took up and grew the varieties. It was the same case with the paddy variety G.E.B. 24 (called Coimbatore Sanna) of which only a few seers were got out first and grown on the Government farm; the produce was distributed to (or really demanded by) a few villagers; it was from such small and insignificant beginnings that the variety soon spread all over the State. Generally these varieties advertise themselves, and this line of work is perhaps the least difficult among many items for the extension staff. In this case also it is the first few who have to be

persuaded, the others follow without any stimulus or urging, forcible or otherwise. Under many irrigation schemes, both old and new, areas or blocks (or '*hantas*' in Kannada) are reserved for particular crops in particular years and only these crops can be grown on these blocks and the ryot has no freedom to grow any crop he pleases. This is a very old practice in certain tracts followed without any complaint and it has been introduced under the new projects also.

While in these special forms, compulsion is largely shorn of its severe and ugly features, compulsion raw and full-blooded, with penalty for evasion and with the necessary staff to enforce it, must be considered quite foreign to the spirit of the extension service and to be strictly avoided if it is at all possible. It must be added however, that Governments even in India have not hesitated to resort to this expedient if it was deemed quite necessary. For example, the Pest Acts and Pest and Noxious Weeds Acts, enforce the adoption of timely remedial measures; the Cotton Transport, and Pressing and Ginning Acts restrict movement of cotton seeds and fix the zones of cultivation for varieties for being grown pure, and for preventing mixtures; there is the *kudi maramat* legislation enforcing labour for the repair to canals; there are Village Sanitation Acts enforcing sanitary arrangements in village streets and houses; there is the Compulsory Primary Education law to compel parents to send their children to school; Government also fixed the proportion of the rows of grain crops to the rows of commercial crops in mixed cropping in order to increase the production of food grains; there is the recent Fallow Land Cultivation Act passed in Mysore compelling holders to cultivate their fallows so that all cultivable land may be brought under crop. It is possible that many of them may remain only a dead letter, or at least not enforced with rigour, but they are mentioned to show that the idea is by no means novel.

It may be interesting to note that compulsion was resorted to on a very large scale and enforced with rigour,

as an emergency war measure during World War No. II in Great Britain, when in order to produce sufficient food grains for the people within the country itself arrangements were made to make every inch of the country's agricultural land produce its maximum. Every acre of land that could be brought under the plough was taken up for cultivation, and the famous grasslands and pastures of the country were broken up and put under wheat. Every farm was inspected by Boards of Scientific experts and practical farmers, the improvements like draining, liming, fencing and even repairing derelict labourers' cottages, not to speak of the cropping methods to be adopted were listed, and farmers were compelled to adopt and attend to them promptly and thoroughly, being helped, if necessary, with finance. Tractor ploughs and ditching machines worked even at night with head lights and every kind of work was speeded up and geared to intensive cultivation and maximum production. Farmers who were unwilling or unable to improve their farms in this manner were simply removed and the work taken over and performed by Government, the cost being a charge on the farm. The results were astonishing and breath-taking; the increased production was phenomenal and the whole campaign demonstrated to the world the determination and doggedness of this nation, their ability to rise to the needs of a desperate situation and overcome it. Dependence on imported foreign foods for the nation has been Great Britain's most vulnerable weak point and her enemies were not slow to take advantage of it; indeed at one stage in the World War No. I Germany nearly cut this Achilles heel by her submarine warfare blockade and brought the country perilously near starvation, before her usual luck turned and saved the situation. Compulsion was her saving, and she made no bones about it, despite whatever may be said on ethical grounds by this freedom-worshipping nation.

Compulsion with all its terrors, 'red in tooth and claws', is exemplified in the 'collective farming' methods of Soviet Russia where in the interests of increased production

by scientific methods and for the adoption of all the results of research, landowners and sturdy individual farmers have lost both their land and their freedom and been reduced to the level of wage-earners taking orders at every step from Government officials. It was accomplished admittedly by ruthless coercion and the application of all forms of administrative and economic pressure regardless of blood and tears.

Let us hope that no emergency of the former kind will ever arise in India nor a form of Government which will not hesitate to resort to the methods of the latter!

Nevertheless it may be desirable and necessary to have recourse to the modified or hamstrung type of compulsion which we have described already in certain cases and in certain areas of which examples have also been given. In the restricted sphere of the National Extension and Project Areas, with the advice and help of the several technical officers available and with other facilities like loans also being provided, it may be permissible to resort to one or other of these milder forms so as to achieve rapid progress, much to the pecuniary and other advantages of the agriculturists. In fact, it is gathered from newspaper reports that the whole of the Tanjore District is to be so operated towards this end that there will not be a single inch of ground but will be performing its maximum duty as regards production. It is inconceivable how this can be brought about unless such modified or diluted methods of compulsion are exercised wherever it may be found necessary. After all, it is argued, when the state executes gigantic irrigation schemes and brings water on to distant fertile lands, is it not desirable that crops and cropping methods should be geared to maximum benefit and will not a moderate element of compulsion be justified if it should be found necessary.

A passing reference may also be made in this connection to another form of exercising compulsion to which the name Compulsory Co-operation has been applied in spite of its being a contradiction in terms. Co-operative societies of certain kinds, notably for a very important purpose like

the consolidation of holdings have bye-laws which lay down that if two-thirds of the landowners agree then the remaining one-third have to submit however unwilling they may be. There is no doubt that genuine hardship may be caused to the latter but they have to submit, it is argued in the interests of the larger section—a doctrine which if logically carried out and applied in other spheres of life may have serious consequences. Still it seems to be acquiesced in without demur and it is a question whether it may bear extension into the spheres we are considering. Though the element of compulsion is thoroughly foreign, as I have said, to the spirit of the extension service there may be circumstances which may justify or extenuate it in a modified or diluted form which has been admitted and adopted in practice as exemplified by the cases cited. In any case the method is worthy of being considered in all its aspects such as desirability, the particular form it should take, its limitations and so on.

PRINCIPAL, TRAINING CENTRE FOR VILLAGE GUIDES
4 MAR 1955
GANDHIGRAM

PART III

IX. AGRICULTURAL IMPROVEMENTS

(*a*) GENERAL*

Extension of Cultivation.—The extension of the cultivated area has been largely taken up in recent years especially under the "grow more food" schemes, when the grant of uncultivated land for cultivation to particular classes of people or to all applicants in general has been speeded up and the rules of disposal liberalised and very large areas have come under cultivation to which some reference has already been made. Considerable areas however are still available in many villages and in somewhat remote situations; forest land in what may be considered forest only in name, date groves, *kavals*, etc., all afford some scope and the question of throwing them open for cultivation will have to be considered sympathetically, especially where the areas are not serving the purpose for which they are ostensibly and specifically set apart, and not releasing them for cultivation would only amount to a dog-in-the-manger policy benefiting neither the Government nor the people.

The ploughing up and growing crops on land now returned in the accounts as "current fallows" affords substantial scope for the extension of cultivation. It is doubtful if all such land is allowed to lie fallow only for a season or two as part of a rotation of cropping with fallowing, or lies more or less waste for various other reasons. In either case efforts should be made to bring them under cultivation. In the first case the fallow rotation can be dispensed with and the growing of a restorative crop of, say, horsegram at least may be substituted. In the second case the particular reason or reasons for leaving them waste should be examined by the Extension staff and efforts made

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* Only a brief outline is presented here. For a full and more comprehensive treatment, my book "*The Principles of Crop Husbandry in India*" (published by the Bangalore Press) may be consulted.

to remedy them, so that they may be cultivated every year. If the fallow is due to the fact that the owner has more land than he can cultivate regularly every year then it may be planted up at least with suitable trees; these may be "growing while you are sleeping" as the saying goes and it will involve little more trouble than the planting or sowing of the seeds in the early monsoon without even the need for guarding them against cattle, provided the trees selected are such as are not eaten by cattle. Even if they do not yield any marketable produce they will serve at least as the owner's wood lot affording fuel or fencing material.

It may be interesting to note that the need for bringing these fallows under cultivation has been so strongly felt that the rather drastic step of enacting legislation has been resorted to, and the "Cultivation of Fallow Land Act" is now on the statute book in Mysore. Under this Act Government has taken powers to compel the owner to cultivate the fallow, failing which the lands will be taken over by Government and leased to anyone willing to cultivate them, for a period of three years.

Improved Implements

Tillage Implements.—The use of the improved or mould board plough instead of the country plough is almost a basic improvement. There is a great choice available, nowadays, *viz.*, the Kolar Mission plough, the Bar Share plough, the One Way ploughs of the Kirloskar manufacture, for all general purpose ploughing in the maidan areas, the small Eureka plough and similar types for rice cultivation, for malnad use and in tracts where the bullocks used are small in size and the work is light, and the most suitable type to particular conditions should be popularised.

The use of the heavier type such as those of the Kirloskars for ordinary ploughing on the black cotton soil, and of the very heavy types for ploughing these soils deep in the hot weather for the destruction of the *hariali* grass, although fairly general, should continue to be popularised.

Both ploughs and ploughshares, the latter especially should be available readily either in the village co-operative society or in one not far off and it should be seen to that users change their shares before they are worn too much. If village blacksmiths can be trained to weld new steel points so much the better.

The use of the six shovel cultivator to take the p'ace of the second and subsequent ploughings by the country plough, should be extended.

Introduction of the heavy *dodda kunte* or bladed harrow in the red soil tracts also where they are not now in use.—There are many operations for which this could be profitably used especially for work after harvest after the soils have somewhat hardened, and to scrape off heavy weed growth to prevent it from seeding. The weeds like *Annésoppu* (*Celosia argentea*) appear in great luxuriance after the harvest of the main crop and the *dodda kunte* will do a very good job when worked on such land. The implements must of course be readily available for sale in the departmental depots or co-operative stores.

All the above are for individual use. Jointly by the village itself, one or more disc harrows capable of being drawn by one pair of bullocks can be maintained also, for use by such villagers as can use them for cultivation, clod crushing, for after-harvest discing of the fallow field and can be made available to them for hire.

At the taluk or district level, a good size tractor which can work two plough bottoms for deep ploughing on the black cotton soil or a pair of large disc harrows or 'harrow' plough for light ploughing to a depth of about 5 inches on fields softened by good rain and which will be tantamount to the work of six or seven country ploughs will be a desirable introduction. Where fields are suitably situated, whole villages may be served by the lighter outfit so as to speed up ploughing, leaving the subsequent operations to be carried out with bullock-drawn implements like the six-shovel cultivator *dodda kunte*, harrows and the like which are already in use.

Of course such tractor outfit should be in charge of a special organisation well equipped with skilled ploughman-drivers, repair facilities, petrol, lubricants, etc., for continuous and efficient work and should be made available for a moderate rate of hire per acre. Ploughing his lands in time before the soil moisture dries up is the farmer's most important concern and his inability to do so is the cause of both mental anguish and frustration.

It is reported that in some Extension areas attempts are being made to introduce a new type of improved plough called the CARE plough, and also hand digging tools like American spades, shovels, etc. It is evidently not recognised by those responsible that the Indian departments of agriculture have laboured hard to design and popularise ploughs suited to the local conditions, in respect of size, weight, simplicity and ease of work by both ploughmen and bullocks, and that ploughs of different types are now manufactured and sold in thousands already and are daily on the increase, and improvements are also being attempted in more than one direction. It may not be generally known that improved ploughs, cultivators and other implements have bulked largely in the sales from the department in Mysore, varying from 613 in the year 1914 to 3,556 in 1930 and reaching the peak figure of 5,621 in the year 1950. In addition there has always been a respectable number sold by private manufacturers.

Further in regard to hand tools, the Indian ryots have a variety of these which suit their methods of work admirably and with which they can do as good if not a better job than the costly imported tools, which are thoroughly unsuited to their condition and methods of work. It will obviously be a waste of effort to pursue this line of activity, and the best plan will be to work on the foundations already laid and with a better realisation of the local conditions. Incidentally one has to correct the ideas prevalent among the well-meaning kind-hearted Americans who send out these implements that the Indian ryot is a sort of 'Heathen Chinee'

and to emphasise the fact that many of his practices are the result of centuries of experience and are admirable in their own way. 'The whole world', says Col. Wilks the historian of Mysore, 'does not exhibit a cleaner system of husbandry than that of the cultivation of ragi in the home fields of Mysore',—an observation well worth recalling in connection with the tillage methods of Mysore. It will take many years of patient research and experiments before real improvements can be suggested. Much has been achieved by the various departments during well-nigh half a century of such work and it is up to the extension officers to draw from this well-tested store of knowledge for suitable material to popularise.

Seed drills.—Many types of seed drills are already in use and are such as cannot be easily improved; they are simple, cheap, and fairly efficient although they are not without defects. The excellent practice of sowing only in lines either by regular seed drills or by a *saddé* or seed tube tied behind the plough in plough furrows should be made general. Village conditions are changing and the old-time village craftsmen are becoming scarce and it is not easy nowadays to get these seed drills for all those who may require them. This should be arranged for specially and they should be made available for sale in the sale depots.

Threshing rollers.—Although these have become very common in the villages of the State still there may be villages in certain parts where they may be still unknown or not used by villagers. The convenience and speed of the method have been well appreciated but the difficulty may be that the rollers may not be easily had on account of there being no quarries within convenient distance. Facilities may therefore be created for supplying them in all such villages.

Chaff cutters.—In the jola tract these are already in use for cutting up dry jola stalks but where a lot of green jola is fed, chaff cutters are not in use, the practice being to feed them whole, very often by a process of cramming or "forced" feeding. This laborious and slow process is

hardly necessary and can be advantageously replaced by feeding chaffed material. Even where chaff cutters are in use for feeding dry fodder, the type of local cutters is not very efficient and is certainly too slow and can be replaced by the circular blade hand-worked types. These are easily available and are not too costly either; a large number is already in use but efforts may be made to introduce them more widely.

Sugarcane mills.—Improved types of bullock driven sugarcane mills of the Nahan pattern have largely replaced the older poor makes of iron mills and are now being made by many companies, the Kirloskar, Madurai, the Mysore Government Workshop and others and have become very popular. Nevertheless they have not completely replaced the older ones, which may still be seen in use especially by the professional custom milling gangs who buy the standing cane and do the milling and jaggery boiling or who merely do the work on contract. In the latter case it does not concern them how efficient the mill is and there is no urge to use a better mill. There is considerable room for propaganda among them to use a better mill, and for the others facilities should be created for supplying new mills to replace the worn ones. In recent years the boiling pans have also become very difficult to get, owing to the control and the scarcity of iron sheets. Help has to be rendered in supplying these pans also.

It will be a great advantage in the shape of an economy in time and labour and of a higher outturn of jaggery, if power crushing mills can be installed. This should be considered where some twenty acres of cane may be under cultivation within a small radius, if not in one block. Such small power units driven by an oil engine or electric motor, together with a battery of boiling pans and improved furnaces may be run either by one large grower, milling not only his own cane but also allowing neighbours to use it at a moderate charge per ton of cane milled or maund of jaggery made or in common by all the growers. If a co-operative

society can be organised in preference to individual ownership it will be all the better. It will be necessary to give it considerable help and nursing but in the new set-up, it should be an ideal field for the extension staff and the co-operative department officers of the project areas to participate in. With such help the society may become a great success and afford very striking evidence of the good work of the new staff.

Arecanut driers.—In the malnad the harvesting season for arecanuts has to commence even before the cessation of the monsoon rains, and drying under artificial heat over dull wood fires is often resorted to, which is both risky, and painful to the eyes besides resulting in a poor quality of the nuts. A cheap local adaptation of an imported drier has been designed and introduced, and this appliance deserves to be popularised further in all such tracts, especially as it can be easily erected out of materials locally available or can be easily procured.

Storage bins.—An important improvement worthy of introduction is the use of metallic bins or bins of concrete or brickwork, for the storing of grains and pulses. The loss in storage at present by primitive methods like storage in underground pits, wicker or bamboo or straw bins of various sizes and patterns above ground, or even the wooden *panithas* and storage rooms, through insect pests, rats, and even fungi are very great and sometimes ruinous. In the aggregate it is sometimes put down at the huge figure of 3,000,000 tons for the whole of India, but apart from this staggering estimate, it is one of the commonest troubles of the producer and a great loss to the community. If substantial metallic bins are introduced (these will be more convenient than concrete or brickwork) it will mean a great saving. At one time such bins were attempted to be popularised and as a first step they were used in the farms and the agricultural depots. The matter was not however pushed through seriously, but in the present set-up it deserves to be taken up and popularised. Suitable patterns of various

sizes can be designed and arrangements made for manufacturing them in the present implement factories. If plain sheets or bent pieces for the requisite sizes can be supplied at a low cost even the village blacksmith can put them together and erect them in the farmers' houses. It may be noted that in the U.S.A., financial help to help farmers to put up bins is substantial; loans up to 80 per cent. of the cost is advanced at 4 per cent. interest and are made repayable in four years. A similar and if possible more liberal aid will meet an important need and help to introduce this improvement.

Cream separators and butter churns.—Mysore is a great butter making country, and great quantities are made in the Shimoga malnad, in the black cotton soil tracts with their abundance of cotton seed for feeding to the buffaloes and in the Mandya and surrounding channel tracts, and in many other parts of the State. There are not only professional buffalo keeping tribes but also and to a greater extent, those who keep a head or two only, from both of which sources a very large supply converges into the *santhés* and the cities. These families naturally handle substantial quantities of milk for cream removal and for churning the cream into butter. The methods are very primitive, the outturn is low, the quality of the butter is very bad, often foul and dirty giving rise to a very bad smelling ghee when it is melted down. The consuming public patiently and uncomplainingly puts up with it because there is no help. It is quite possible however and easy to manage too, to replace the present methods by better ones using a cream separator and a barrel butter churn; a higher outturn of butter and an incomparably better quality of butter will result, which should be appreciated by both the producer and the consumer. The outfits can be managed co-operatively, or their use, especially that of the cream separator permitted on a small hire, in the more important villages. It is a matter of some organisation, which is eminently suitable for the new extension staff and the co-operative department officers to

take up and develop. Even on a small scale attempts may be made to replace the present pot churns with the whirling beater, by the malnad or bamboo churn with its up and down beater; for one thing it is possible to wash and clean the butter free largely from the casein-containing curd or butter-milk, in the latter method, which ensures therefore a better quality of butter. Whether for small household use or for large-scale commercial butter made by the professional buffalo keepers, it should prove a great improvement. The keeping of butter for more than 3 days induces bad odours and rancidity, which persist in the ghee made therefrom. The butter should be sold therefore twice a week instead of once a week as at present and the main cause of deterioration thus avoided.

Other small-scale appliances.—The use of metal wire gauze sieves for skimming ladles required for scum removal in jaggery boiling, hand sprayers and dusters for small-scale use for applying insecticides and fungicides are also useful items to popularise and these should be readily made available in the sale depots.

Improved conduits in well irrigation.—A very desirable improvement in well irrigation will be the use of regular pipes or at least half sections of glazed earthenware pipes for leading water from the well to the fields. At present the water is led only in ordinary earthen channels, in which the loss by seepage in the transmission is woefully great. Sometimes the fields are situated quite a furlong from the well and considering the expense and trouble of lifting the water it should be considered sad. Proper conduits or flumes made of cement, or of galvanised metal sheets or glazed earthenware pipes or half pipes should be recommended and extension officers should also make it easy for people to obtain these from wherever they can be had. If palmyra or cocoanut or date stems can be had, they will also make passable home-made flumes, when cut along the length into equal halves and the interior scooped out.

Manures

Farmyard or cattle manure.—The conservation of cattle manure is a very important matter, because that is about the only manure available to the majority of farmers and in any case has to be the indispensable basic manure for whatever mixture with artificials and other concentrated manures which may be used. There is a lot of avoidable waste, due to (*a*) the faulty cattle stalls in which there is no provision for the collection of the urine and (*b*) to the methods of storage. Both will have to be attended to as improvements and both propaganda and necessary financial and other aid will have to be given. To have stalls with watertight floors, stone-paved or compacted with gravel like a metalled road, with a good slope and a gutter to catch and lead out the urine, and a cistern or pot to collect it, is not too difficult to manage. The use of bedding material should also be encouraged, dry leaves or fresh earth, waste straw, or even dry and powdered cattle manure and fresh earth—all being renewed frequently—should become general. I was surprised to find during a recent visit to a village that green *honge* leaves were being freely used as bedding in the stalls, to such an extent indeed that trees were raided and lopped for the purpose clandestinely, an act quite reprehensible morally no doubt but very praiseworthy and gratifying agriculturally. In any case it was evident that people were taking to these improvements.

The construction of manure pits in such a way that not only is the loss of fertilising matter prevented largely but such matter may be added to, is an important complementary improvement, and both should go hand in hand. Pits protected with a roof against rain, bunds or preferably dwarf walls against surface flow, the addition of the daily collection of the urine from the stalls, the carting of red earth, tank silt, dry leaves, farm wastes and all manner of rubbish of manurial value of vegetable or animal origin, the addition of water to prevent undue driage, periodical turning over or stirring to promote homogeneous rotting have all to be

introduced. The putting down of compost pits or heaps is very similar; the utilisation of human excreta as an ingredient in the compost is also to be encouraged. As already described under 'village sanitation' these are attended with many difficulties, to the methods of overcoming which to some extent reference has been already made; persistent efforts will have to be made and facilities created for the adoption of these improvements. One large landowner I noticed had put down six large manure or compost pits each about 6 feet broad, 30 feet long and 5 feet in depth, which had been filled with alternate layers of manure and red earth! Although the work is capable of improvement still it shows what is possible by at least the leading landholders in villages. What this farmer could do others can also do without doubt.

These measures relate to individual owners. It is sometimes suggested that large compost pits or heaps may be started as a common or communal effort, the manure, street sweepings, human excreta, etc., all being utilised. I am afraid this will dry up individual enthusiasm which is based upon self-interest which is so necessary in this matter, and in any case lead to difficulties in the apportionment of the material. Villages are already split by parties as is well known and this will be only bringing in a further element of discord. Extension efforts will be more fruitful if directed to individual action rather than to communal action in this particular sphere.

Closely allied to this problem of manure conservation is the deplorable practice of using cowdung as fuel, which is almost universal in the country. The loss to the country's resources of this all-important manure should be colossal. In the villages huge quantities are converted into dry cakes both for daily use and for storage against the rainy season; the forests and grazing areas are also scoured and picked clean of the dry droppings that lie scattered, and are brought in for sale or stored for domestic use. It is an article of trade in the towns and cities and carts laden full with the

dry cakes brought for sale are a common sight besides smaller quantities brought in headloads. Of course it is the scarcity of fuel both in the countryside and in the urban areas that is mostly responsible for this practice and until alternative fuel is made available in sufficient quantities the practice will continue, the more so because it is a source of money income to the women of the village. F. L. Brayne in his book "*Socrates in an Indian Village*" urges Indian women to refuse to do the dirty work of kneading it and putting it in the required shape and to give up the practice altogether. No doubt if the will is there much can be done, for the needed fuel or firewood for their households at least can be procured with some effort, and the cities and towns may be left to carry on as best as they could, using firewood, charcoal, electricity or gas whichever can be had. Extension officers have to be ceaselessly hammering on this theme until the people realise their folly and divert the material to its legitimate use. It looks as though the practice is on the wane; one does not see the stuff being brought for sale, except rarely, in the streets nowadays in contrast with the earlier days when it was a familiar sight and a persistent street cry. It is probably due to the large extension in cultivation and perhaps a better appreciation of its value. Anyhow it is a good sign and extension officers should do all they can to help in the total disappearance of the practice.

Carting tank silt.—An old and excellent practice of increasing the fertility of the land is to remove silt from the dry tank beds during the hot weather when most of the tanks of ordinary size become dry completely or partially and to cart it on to the fields. Both in improving the physical condition, and in adding ordinary fertilising material, the silt is a valuable material; furthermore the practice has the effect of reducing the rate of silting up of the tanks and at the same time making up for the effect of wash and surface erosion of the high lying dryland fields. Though a well-known practice it is not always adopted nor by everyne owing to indifference or lack of general agreement

among the villagers or other causes. The scope lies in looking into these causes and in remedying them, so that it may be adopted whenever the condition of the tank will admit of it.

To the same class of work belongs the removal and utilisation of tank moss from the beds of tanks which are rapidly drying up. This will have to be resorted to as a communal measure, the quantity removed being apportioned among participating villagers in a fair manner. In any case the tank bed is a repository for large quantities of fertilising materials and should be invariably made use of. Both the practices are very old ones, and attempts lie only in the direction of systematic adoption and restoration where it may have been given up or neglected.

Bones and animal refuse.—The great value of animal matter of all kinds of bones and flesh, blood, offal as suppliers of important plant foods should be brought home to farmers who should be induced to carefully husband all such material for use as manure either by direct application to the land or being composted and decomposed in the manure. In houses where animal food is consumed there is a fair quantity of such material available almost every day. In western cities petty tradesmen the 'rag and bones men', as they are called, go round and buy such stuff for sale later to processers, and it is all therefore made use of properly. In our own towns and villages they are not turned to the best use but are largely wasted. Even in the regular abattoirs where one would expect a better state of affairs there is a great deal of waste.

In addition, there is the mortality of cattle both the normal one due to natural causes and the abnormal one due to epidemics. The method of disposal of the carcasses is an abominable sight, a danger to cattle and human health and wasteful in the extreme. Skinned carcasses are simply thrown away, vultures and other carrion birds, village dogs and the scavengers of the jungle gather as for a feast, the atmosphere is polluted and the clean-picked bones with even

the marrow eaten away by ants, are left to dry and bleach in the sun. I am describing sights which I have actually witnessed especially in villages in Upper India. Ordinarily however the village chamars take charge, the skin is divided half and half between the owner of the beast and the chamar, the meat is partly eaten, carrion though it is, and the remainder along with the offal is simply thrown away. The bones are sometimes collected and sold but more often are thrown away. In addition to the quantity which thus accumulates in the villages, there are the bones of the animals killed in the jungles and waste lands, which strew the ground and lie bleaching in the sun, but which are sometimes collected for sale.

The best form of disposal will be of course for the bones to be ground into bonemeal, either with or without a previous boiling to recover the gelatin, or to convert them into bone superphosphate in special factories. There are a certain number of establishments in the country which turn out one or other of these products, but the large bulk of the bones is exported out of the country. There has been considerable outcry against this export as it amounts to depleting the country of this very important manurial resource, but the export continues despite protests. Mahatma Gandhi suggested that village tanneries should be opened and carcasses handled there by up-to-date methods. If such should be started they will be the means not only of turning out an excellent leather and faultless hides, but also of utilising every part of the carcass to the best advantage, including the processing of bones, flesh and offal for manurial and industrial purposes. Incidentally such tanneries will keep alive the marvellous skill and knowledge of secret processes, by which some of our chamars can prepare leather soft as silk, sole leather which will wear a life-time, fine moroccos and leather dyed in different colours—valuable national assets which, alas! are fast disappearing.

Green manuring.—The importance of green manuring has become well recognised and the extension service has

only to keep it well before people's mind in the villages and to remove obstacles in the way of its adoption, to create and increase permanent resources by way of plantations and so forth.

Sannhemp is a universal favourite on account of its quick growing habit but it is an excellent green fodder and is therefore liable to the risks of being grazed down. Village should be urged and encouraged to grow it so that it will be to everyone's interest to prevent their cattle straying or, in the alternative to keep a watch at joint expense. It should be grown as a preparatory manurial crop not only for paddy but also for sugarcane and potatoes. In the case of sugarcane it is also possible to grow it on the sugarcane beds by sowing seeds as soon as the cane is planted, in the same way as various catch crops like greens, radishes, coriander and onions are grown in the beds where this method of cultivation is in vogue. The sannhemp crop can be cut down and spread as manure in about six weeks, however moderate the growth may be.

Sannhemp may be grown in rows as a mixed crop in dry-land fields along with ragi or jola in the same way as *avare* or *togare* and other (*akkadi*) crops are grown, and allowed to seed. It may be possible for each man to raise enough seed for his own needs without having to buy it. Other legumes like cowpeas, greengram and other pulses may also be grown if so desired, and this should be encouraged.

Where cattle trespass is too great to permit such crops, others like dainchas, wild indigo and several other such green manure crops which cattle do not eat may be grown instead. The necessary seed supply of these as well as sannhemp will have to be arranged for by the extension staff and a sufficient supply stocked in good time before they are required for sowing.

Besides growing a green manure crop where it is required, getting green manure from elsewhere is also a familiar practice and such supplies are usually gathered from forests and waste lands and brought in for sale. Any difficulties in

getting such supplies owing to needlessly strict control or harassment by forest or other authorities should be inquired into and steps taken to relax or remove them and make it easier for people to get the supply.

Honge (*Pongamia glabra*) trees grown as private plantations or as natural growth on Government land besides isolated trees on margins of cultivated fields form the most important sources. Wherever facilities by way of surplus land exist, the planting of such trees should be encouraged. The cutting down of *honge* trees for fuel within the last five or six years has resulted in a serious depletion of green manure and the harm is bound to continue permanently. Such felling should be strongly discouraged and even penalised by law as has been done in Mysore. Anyhow the seriousness of this destruction should be constantly brought home to the villagers so that village opinion may act as a further deterrent.

Green manure trees both quick growing and devoid of a spreading canopy can be planted on field margins and lopped freely for furnishing green leaf manure. It will be a very good practice to utilise small trees like *Glyricidia maculata*, *Erythrina indica*, *Cassia siamia*, and even shrubs like *Tephrosia candida* for growing on field margins almost like a hedge and lop them severely for their leaves and branches. Damage by cattle is a risk in the case of some but if they are guarded till they grow about five feet or protected in other ways, much mitigation can be secured; even otherwise the risk is worth taking.

The Concentrated Manures

These comprise ordinarily and in the main (1) oilcakes of different kinds, (2) sulphate of ammonia, (3) superphosphate of lime, (4) bonemeal and (5) sulphate of potash. There are quite a number of others like urea, calcium cyanamide, ammophos and so on, but it will be better to confine attention to these for the generality of farmers rather than a multiplicity of fertilisers. The time is long past when even

wide-awake farmers were afraid of these (at that time) novel manures and hesitated or avoided to use them. I have already related my experiences of these pioneering days but thanks to the popularity that has now come about, extension officers are spared the propaganda efforts of diverse kinds. The following points however may be stressed in connection with their further work in respect of these concentrated manures:—

(1) The fact that manures form the biggest single factor in increased crop production next to water, that bulky manures like cattle or green manure, etc., considered so far cannot adequately supply the need and that they will have to be liberally supplemented by concentrated manures will have to be ceaselessly impressed upon farmers, so that they will receive the attention they deserve and continue to be used regularly and in sufficient quantities.

(2) Efforts should be made to see that they are used by every cultivator for all irrigated crops, if not for dry crops as well. Every such grower should be canvassed, the requisite quantities of the different manures should be estimated and arrangements made for putting in a sufficient supply in the nearest sale depots, so that the supply may be both handy and in time. This close contact with individual farmers and ascertaining and supplying their manurial needs in this manner means intensive work but it is quite well worth it in view of what has been said about the role of manures in increasing yields.

(3) The manurial doses for the different crops to be grown should be decided in consultation with the higher officers of the Agricultural Department stationed in the taluk of the district in terms of the manures available, and in case a variety of them is available then the quantities of each which can replace definite quantities of another should be ascertained and the cheapest doses decided. It may be possible that some particular oilcakes may be available locally and if they are found cheaper, judged by their nitrogen content than the other oilcakes or sulphate of ammonia,

growers should be helped to substitute correct quantities of the cheaper kinds for the latter.

(4) The information regarding manurial doses should in fact be at their finger's ends and it will be useful to have them noted down in their pocket books for ready reference. Although it will be generally necessary to decide doses in consultation with the agricultural officers and decide doses according to local conditions, still for the sake of practical convenience and for rough guidance the doses for various crops are included among the improvements recommended for particular crops in the following section.

(5) As a general rule the use of nitrogenous manures should always be advised, for Indian soils respond invariably and strikingly only to these manures. Phosphates and potash manures play a very subordinate role and the response to them is not uniform. This fact should be borne in mind especially in contrast with American practice which lays an all-important stress upon phosphates. The dictum "the hub about which farm demonstrations turn is the soil mineral phosphate" as stated by David E. Lelienthal in his "T.V.A." will have to be taken with a great deal of caution in connection with Indian soils.

(6) In certain cases the use of lime may be necessary and advantageous and the advice of the agricultural officer should be invariably sought to decide the point.

Autumn ploughing.—The ploughing of dryland fields after harvest is over and leaving the soil in a roughly ploughed up condition throughout the hot weather instead of with a hard compact weed-grown surface has been found very beneficial in many ways, the total result of which is a better crop in the succeeding season. In addition to this advantage it makes possible the cultivation of an early crop like gingelly, short season groundnuts, fodder jola, and many of the pulses, as the ploughed up fields absorb the very first rains fully and become fit for the very first ploughing facilitating the early sowing. The early-sown crops can be followed by another crop in the same year of a similar short

duration if desired. This post-harvest ploughing is not easy but wherever the soil becomes too hard to take a plough a deep stirring up with a cultivator, or *dodda kunte* or a disc harrow, will have to be carried out. Even if a man's full holding cannot be tackled, as many fields as possible should be ploughed up. That the removal of weed growth will deprive cattle of even their scanty grazing will be raised as an objection; that the land is 'maturing fertility in its womb' during this fallow and that this should not be disturbed by ploughing will be another objection; but these are generally only ways of exaggerating the difficulty and an excuse for not doing it. Quite a number of people on the other hand are carrying it out to the extent possible in the belief that a ploughing of this kind (known as *Maghi ukké*) is equivalent to adding manure.

Pest and Disease Control.—A matter of great importance applicable to all crops is the combating of pests and diseases. Every crop has its complement of these troubles some being subject to a large number, others to a few, some of them being regular yearly visitants, others occurring in particular years almost like an epidemic. The toll taken is enormous and estimates of annual losses are sometimes given in figures of astronomical magnitude. The sad part of these attacks is that even the best ryots feel helpless and have to look on with fatalistic resignation while the result of months of their labour is being ruined before their own eyes; in every other aspect of crop raising they may hold their own but against pests and diseases they simply bow down. Pests are not confined to crops on the field but attack produce in storage as well, causing equally serious losses. It is in this sphere of crop raising therefore that the help and advice of the technical staff is of the greatest need and will be most appreciated. The need for strengthening the plant protection staff cannot be over-estimated.

Luckily, for many serious pests and diseases, effective control methods have become available, thanks to years of patient research and one of the most important functions

of the present staff will be to take timely measures, to have insecticides and fungicides and the necessary spraying and dusting appliances in readiness and in the required quantities and to see that these are applied promptly. The village level workers will have to be sharply on the look out during the season, to report outbreaks as they appear immediately, to secure the assistance of the technical staff without delay, to induce villagers to take joint action where this may be called for and in fact, to see that the pest or disease is controlled effectively and the crop saved. Prompt notice and attention will sometimes obviate the need for large measures, especially in respect of pests like the Epilachna beetle in potatoes, the hairy caterpillar pest of ragi and so on, which are amenable to simple hand picking in the early stages.

In respect of the storage pests of grains and pulses, a very simple control measure is the preservation in good metallic receptacles and covering the surface with a two inch layer of sand. The staff can see that this simple method is taken up universally and thereby effect a material saving to practically every ryot.

The materials and appliances for the work should be stocked in sufficient quantities in the local agricultural depots, co-operative societies or private dealers, so that they are available readily. The whole work in this connection will be so much appreciated that the practices will become an integral part of the village economy in the course of perhaps a couple of seasons.

(*b*) SOME INDIVIDUAL CROPS*

Rice.—Rice is capable of being grown in all seasons throughout the year, depending upon the supply of water available, two seasons being broadly distinguished, *viz.*, the rainy season from July to December and the summer season from about January to June. There are varieties of paddy

* For a comprehensive account of these and other crops the reader is referred to my book "*Field Crops of India*" published by the Bangalore Press, which deals with 59 crops.

suitable and peculiar to each season and care should be taken to see that the correct variety is chosen for the season. As recommended as a general rule for all crops a germination test should be made before deciding to sow the seed. A uniform and quick germination of at least 80 per cent. should be aimed at in the quality of the seed. Mixtures which are easily made out by the different colours or shape and size of the paddy grains should be avoided if possible, even if it is only a small percentage, but if it is really serious the seed should be discarded and a better lot secured. Seed grain should be thoroughly winnowed and screened, in order not only to remove light grains but also to separate out weed seeds which can be screened through. Good seeds are one great factor in high yields and a high quality should therefore be ensured. Seeds should be selected also by the salt water method using a salt solution containing about 5 lb. per gallon of water. Usually in the case of ordinary seed grain about 25 per cent. will float and will have to be discarded and the remainder alone used. If seed is of poor quality even 50 per cent. may float and will have to be discorded. The rejected fraction can however be used for consumption.

Where wet nurseries are the rule, the practice of dry nurseries now known as the Japanese method, may be introduced. Such nurseries are to be made in elevated beds in the fields themselves or in the dry area or in other open space round the village somewhat like raising seedlings of chillies, brinjals, tobacco, etc., the beds being watered from well or tank by hand watering. The seed rate may be greatly reduced bringing it down to even 20 lb. an acre.

Rice may be heavily manured especially in fields under tank and well irrigation, as the land is all level and not sloping and terraced.

In puddle cultivation heavy green manuring should be arranged for; heavy doses of artificial manures consisting of 2 cwt. of ammonium sulphate and 1½ cwt. of superphosphate may be applied in two doses one at transplanting

time and again at the last weeding; even at a later stage a small dose of ½ cwt. of ammonium sulphate can be applied, if found necessary.

Transplanting should be in bunches of not more than four seedlings per hole in regular rows. Weeding should be thorough and if possible, new small rotary hand hoes introduced from Japan may be used; repeated and thorough weeding should receive great attention. Prize competition results show the value of heavy manuring and selected seeds in producing surprisingly large yields.

Pests and diseases are common and take a heavy toll. Luckily nearly all of them can be controlled; they should be carefully looked for and treated promptly. Good supplies of the insecticide and fungicide should be kept in stock and larger stock should be got out promptly if the pests have spread and become serious. The pests can all be controlled by simple methods such as the light trap method and the kerosene oil treatment or the use of gammexane; action however, should be prompt. In all cases the plant protection staff should be notified at once and remedial measures to the extent possible also taken up with the co-operation of the growers. The grasshopper pest is serious in Western Malnad; in addition to combating actual outbreaks, the practice of cleaning up field bunds and surroundings in the off-season should be popularised so as to destroy the breeding places and lessen the chances of outbreak.

In the case of certain susceptible varieties the paddy blast disease is likely to attack and practically destroy the crop. If these are to be grown then as a precautionary measure the seeds will have to be treated by mixing it up with Agrosan G.N. in the proportion of 1 lb. to 500 lb. of paddy seed grain and then sown. The material should be kept in readiness and the seed treatment adopted. As in the case of insect pests, diseases should also be promptly notified to the plant protection staff and their help secured.

When the crop is ripe for harvest any mixtures noted should be harvested separately (rogued out) leaving the

bulk pure. Every attempt should be made to keep up the purity of the grain and each village should try and earn a name for itself as a centre where pure guaranteed seed of any particular variety can be had. Even where the paddy is sold for consumption purposes purity of the produce is appreciated and secures a better price.

There is no reason why in all the villages with ample supplies of water a big 4,000 lb. crop of paddy per acre should not be raised uniformly over the whole achakat, adopting the various improvements mentioned. That will constitute a big achievement and will increase the prosperity of the villages as nothing else can, and will be the most enduring monument to the efforts of the Extension Service.

Ragi.—The practice of growing of ragi in rotation with groundnuts may be popularised. In addition to being a legume-grain rotation the digging of the soil which is necessary for the harvest of groundnuts is beneficial to the succeeding ragi crop.

Select the seeds by the salt water method and sow. Also the seed rate may be reduced to not more than 10 lb. per acre instead of double this quantity which is now sown. Where dryland ragi is transplanted as in *kar* ragi districts, apply a small handful of oilcake powder in the holes, stir and then transplant. Where broadcasting is the practice a certain number of fields may be reserved for transplanting and in that case also the application of oilcake in the same manner is useful. In both cases the oilcake manure is over and above the cattle manure which is usually applied before sowing. Extra manuring with artificial manures may be given especially if the tract is one of good rains; in such cases a mixture of 50 lb. of ammonium sulphate and 40 lb. of superphosphate per acre may be applied prior to the last bullock hoeing which should follow immediately. In tracts of good rainfall even green manuring may be given, by sowing a mixture of sannhemp and common pulses immediately after the first rain in fields which had been kept ploughed after the previous harvest, allowing it to grow

for two months and ploughing it in about the end of June or beginning of July and then sowing the ragi about the end of July.

When the ragi is in earhead and prior to the general harvest, select the best plants with the largest earheads and with the largest number of spikes and harvest these earheads separately and dry and thresh them and preserve the grains for seed purposes.

Grow the best variety recommended for the tract by the department pure. H_{22}, R. 0870, R. 0833; K. 1, R. 0871; R. 0786, R. 0324 are among those recommended for Mysore. When the crop is in earhead, mixtures if any can be easily noticed. These should be removed and seed ragi for bulk sowing should be secured from such "rogued" fields, taking care that no mixture comes in again from the threshing floors or other sources. If the "rogued" stack should be threshed first there will be no chance for mixtures coming from the threshing floors.

Introduce the stone threshing roller for threshing, where its use may not be known or general.

In the young crop the hairy caterpillar pest is likely to break out; control by moth picking is easy and a close watch should be kept and the moth picking should be arranged for at the very first appearance.

Sugarcane.—The rotation for sugarcane with paddy though common is not advisable. The sugarcane should follow a semi-irrigated dry crop, preferably a leguminous crop or green manure like sannhemp. This could be ploughed in right away or cut and stored to be applied later on. This practice should be introduced and encouraged.

All land intended for sugarcane should have facilities for good drainage, for which ample provision should be made by digging drains all round and also inside the area itself at intervals depending upon the extent of the need. If close to the tank or channel a good drain should invariably be interposed to cut out the seepage and lower the water table.

The variety to be planted should be as advised most suitable to the conditions by the technical staff; H.M. 320 and C.O. 419 are both eminently suitable, but there is a large number to choose from, and new ones continue to come in.

The sets to be planted should be examined and those showing signs of the red rot or other disease should be rejected and only sound sets should be used.

The planting should be wide and in three feet rows.

Manuring should be liberal. The mixtures used should be of such kind and quantity as advised by the department and applied in the manner and time advised also. A total quantity of even 300 lb. of nitrogen, of 70 lbs. of phosphoric acid and 50 lb. of potash may be advantageous, the nitrogen being partly in the form of oilcake and partly in the form of sulphate of ammonia. If costs should be cut down part of the potash and phosphate may be dropped. A preparatory crop of sannhemp to be ploughed in together with an application of cattle manure and compost to the extent possible should form the basic manure.

The earliest sign of borer attack should be watched for and on the slightest wilting, the wilting shoot should be removed; a light earthing up by a country plough close to the rows will mitigate the attack. There is the biological method of controlling the borer by parasites and this will be attended to by the entomological staff who should be notified promptly.

In regard to milling, one or two trial boilings should be made to test maturity, and the general milling taken up only on the result of this test. The boiling should be over a furnace of the improved pattern provided with chimney, grating, baffle wall, etc., so as to conserve heat and evade smoke nuisance inside the boiling house. A good Nahan type mill properly fixed with the parts tightened and oiled should be used.

In actual milling the following should be attended to:—
(1) Trim the canes clean, so as to remove buds and

small or incipient side shoots completely; (2) remove the tops somewhat liberally, so as to avoid young portions completely; and for the same reason exclude all young cane; (3) mill as soon as the cane is cut and do not keep cut cane for any length of time; generally cut only as much cane as can be milled in the day; (4) mill in the cool hours as far as possible; (5) have the mill cleaned and washed with boiling water before beginning to mill; use metallic vessels as juice receptacles instead of mud pots and wash the same likewise with boiling water; (6) boil the juice immediately after enough juice for one charge is ready and do not keep it; if a delay is unavoidable lime the juice to neutrality and keep it; (7) have all utensils thoroughly cleaned and scalded with hot water; (8) lime the juice (if not limed already) as soon as it is poured into the pan using a litmus paper to judge if the liming is adequate for neutrality and does not exceed that limit; (9) when near the striking point stir a little superphosphate of lime into the charge, this will improve the colour of the jaggery; (10) a thermometer may be used to help in judging the striking stage, the temperature at this stage will be about 118–120 degrees centigrade.

The use of a double pan furnace will be a further improvement and where growers are willing this may be introduced. Help should be given in constructing the furnace according to the departmental plan.

In fields where mosaic attacked or grasslike growth is seen these should be removed; likewise smut affected shoots.

Green tops and leaves are excellent green fodder and, where bullock milling is the rule, afford an ample supply to the bullocks being practically all made use of. Where canes are supplied to factories there is not much scope for using the whole quantity and a large surplus becomes available. The practice of ensilaging these may be introduced, ordinary trench or pit siloes being put down.

The cane trash of which huge quantities become available should be converted into compost manure to the extent possible.

Groundnuts.—The crops, especially the short duration varieties, are very suitable for being grown in rotation with ragi, with advantage to the ragi crop, as it is a leguminous crop and also as the harvesting leaves the soil dug well.

The short season varieties are preferable, in spite of the lower yields to the long duration varieties, except where rains may be expected very late in the year or an irrigation may be possible so as to facilitate digging.

Good strains of both kinds are available and should be grown in preference to ordinary ones. In Mysore the following are recommended: H.G. 4, H.G. 8, H.G. 9 (all erect) and H.G. 7 (spreading). The erect varieties should be sown in very close rows as little even as 6 inches wide; this will result increased yield and may even counterbalance the advantage of the spreading varieties. If the ground is very hard at harvesting (usually in the case of the spreading varieties) and no irrigation is possible, a stone roller may be drawn over the field to loosen the surface somewhat. The haulms after the removal of the nuts should be dried and stocked preferably inside straw stacks, to be used as fodder.

The common pests on the crop are amenable to control by gammexane, and should be treated accordingly.

Castor.—Very good varieties have been evolved by selection and on departmental advice the best should be grown. In Mysore E.C. 1, E.C. 2, E.C. 3 and M.C. 4, M.C. 5 and M.C. 6 are recommended and should be grown.

The castor looper pest is about the only serious trouble, but is both common and destructive. Hand picking should be resorted to at the very appearance and heavier infestations should be dealt with promptly by means of spraying with calcium arsenate, lime, jaggery mixture and other methods. The practice of growing horsegram as an inter or ground crop should be discouraged, and the ground should be kept free, so as to facilitate ploughing between the rows which is a necessary control measure against perpetuating the pest.

Cocoanuts.—The popularity of the crop has led to planting it indiscriminately on all kinds of soils and situations; this should be avoided. If nurseries are to be sown, seed nuts should be selected from mature trees from tracts known for high yields, uniform qualities of the nuts such as size, number of nuts, nature of the copra, etc. If seedlings are to be bought, they should be from reliable garden owners and if possible from nurseries put down by Government. Good stocky seedlings are preferable to tall lanky ones for planting. The seedlings should be planted 36 feet apart both ways, which will give 40 trees per acre. Shorter distance giving a larger number of plants is not advisable. In irrigated tracts, however, the latter may be adopted, and in any case 50 trees per acre should be the maximum.

The practice of green manuring by growing sannhemp as a ground crop and ploughing it in should be advised. In the rainy season, it can be advised in all situations, without any fear of the depletion of moisture for the cocoanut crop. Manuring pays and trees should receive at the rate of 50 lb. of compost, 1 lb. of bonemeal, 1 lb. of concentrated superphosphate, 2 lb. of muriate of potash and 1 lb. of common salt per tree.

The rhinoceros beetle plays great havoc and instructions that may be given by the entomological staff regarding spearing out of the beetles, cleaning up breeding places, trash traps and so on should be fully attended to by all growers.

The tacking of a girdle of smooth tin sheet, such as a kerosene tin opened out, at a height about 15 feet on the stem may be advised for preventing rats and squirrels climbing up. A cheaper arrangement will be a skirt-like girdle made of date leaves, tied about the same height. This will prevent even human pests climbing up.

Potatoes.—The cultivation of this crop deserves to be introduced in most parts of Mysore, and even in the plain country as a cold weather crop, and this may be taken up as a prominent line of work. It is a heavy yielding three

months' crop and is largely in demand. The following points in the cultivation have to be attended to:—

(1) Seed potatoes of the best variety, free from disease, should be obtained. In addition to the Dharwar and Ricketts, the Great Scot is a desirable variety. If seed is reserved from crop grown by the owner in the previous season, he should be sure that the crop had no disease in the field. If purchased, it should be from reliable dealers, guaranteeing quality.

(2) When planting, use cut setts; they have the advantage of economy in seed, and what is more important, it is possible to examine the interior of the set for signs of ring disease and to reject the diseased ones.

(3) The crop should be heavily manured. On a basal dose of 15 cartloads of cattle manure, a mixture of 1 cwt. of sulphate of ammonia, $1\frac{1}{2}$ cwt. of superphosphate and $1\frac{1}{2}$ cwt. of sulphate of potash per acre is recommended.

(4) In the standing crop itself plants beginning to wilt on account of disease, if it should show, will have to be pulled out. Epilachna beetles should be looked for, and hand picked, and if the attack is serious should be sprayed with calcium arsenate, lime and jaggery mixture. The spraying should be repeated twice.

Alternaria disease is also common and if noticed, the crop should be sprayed at once with Bordeaux mixture and the spraying also repeated.

Arecanuts.—In Mysore arecanuts form one of the most valuable crops, its annual export value exceeds that of any other product in the State, being rupees one crore and sixty two lakhs. There is great need and scope for the expansion of the area.

The places selected should have ample facilities for irrigation, not only in the plain country but even in the malnad, because although rains are abundant in the monsoon months, there is generally a great lack of sufficient water in the hot weather months, which will have to be supplied by a good irrigation source. Unlike cocoanut trees which

can withstand a long spell of rainless weather and even drought, arecanut trees are very sensitive and cannot stand even short spells of such weather; any prolonged drought will prove fatal.

Seedlings should be raised from nuts gathered from mature trees giving a high yield or bought from Government nurseries which supply good seedlings.

Regular and adequate manuring is essential, and in the malnad the special traditional methods should be followed, and the addition of new earth and leafy twigs should be an essential feature, in order to reduce and make up for the loss of good soil by the torrential rains. Green manuring with sannhemp can be resorted to also and may be grown all around the areca trees and cut down and mixed with the soil or used to supplement the usual leaf manure. It is easier still to adopt the practice in the plain country.

The bunches should be regularly sprayed against *kole roga* disease twice in the year. After the crop season is over, all dry material from the crowns, being the remains of bare bunches, etc., should be removed and burnt; likewise the debris on the ground, old damaged nuts, shells, etc., should be gathered carefully and removed and burnt. These measures will reduce the carry over of the disease, considerably.

For curing and drying the nuts, it will be a great convenience to have as a stand by for use when the weather is rainy, an arecanut drier, which can be easily constructed from local materials, on the design furnished by the department. Otherwise nuts will have to be dried over a low fire, which is not only risky but also brings about a deterioration in quality and a material reduction in price.

Jola.—There are many varieties, which differ in the season in which they can be grown, period of maturity, colour and shape of the earheads, and in the purpose for which the crop is intended. The proper variety should be selected for the season.

Seed should be treated invariably with copper sulphate before sowing, in order to avoid damage by smut.

Earheads of the kind required, the best among the kind, should be selected for seed purposes before harvest and should be preserved carefully.

The stone threshing roller effects much economy in time and labour, and where it is not known should be introduced.

All grain, certainly those intended for seed purposes should be preserved in earthen or metallic bins and covered over with a 2″ layer of sand and sealed, in order to reduce damage by weevils.

Jola is about the worst crop for pests and diseases. Grasshoppers and the hairy caterpillers commit havoc as soon as the crop is above ground, stem-borers follow, leaf spots appear later, the parasite striga takes its toll, the earheads are attacked by the jola fly (bug), and in storage the grain is riddled with weevils. Fortunately remedial measures are known for most of them and should be promptly attended to in consultation with and under the supervision of the entomological staff.

Cotton.—The destruction of hariali grass in the black cotton soils, for which deep ploughing early in the hot weather is resorted to is an important operation. With manual labour or with the use of heavy iron Kirloskar ploughs, only a small area can be managed per season. Tractors of a suitable heavy and powerful type and tractor ploughs should be used with advantage, and this outfit should be available and worked for a moderate hire.

Cotton should be sown pure, there should be no mixture in the seeds, such as is found in bazaar seed, of *doddahatti* (*G. hirsutum*) in *sannahatti* (*G. herbaceum*) seed and *vice versa*. The mixture should be separated out before sowing. Ryots will not have the heart to rogue out grown up plants in the field later on, and hence the seed itself should be freed of mixtures.

The sowing of the main season *doddahatti* should be made as early in the season as possible, for the reason

that in that case, the crop is believed (and I think it is true) not to suffer so much from the red leaf disease, as it would do if sown later. There is no known treatment by which this disease can be controlled, and hence as a precaution this step should be taken.

In the *kar* ragi tracts the early sowing is easy and the incidence of disease also little.

The new variety M.A.V. is found to be the best and should be sown. Where *sannahatti* is grown, a superior variety like the Sel. 69 should be grown.

Wilt-resistant strains are a great need and the variety called Jayawant of Dharwar is claimed to be very resistant, and may be tried.

Ryots should be discouraged from growing the variety called Bokda. The department has evolved a cross which is devoid of the coarseness of Bokda but retains its high ginning percentage. This should be grown instead.

Selective picking of the cotton, *i.e.*, the sound bolls separate from the bollworm-eaten and stained cotton, and separate marketing of the two may be advised.

Cotton is a crop which lends itself to great improvement by selection. For seed purposes and seed plots (from which the selected seed may be multiplied) the best plant should be selected, the kappas separately picked, and ginned. The hand gin will quite do even for *doddahatti*, and with some care it can be ginned in spite of its difficulty, especially as the quantity concerned can be only small.

Where Cambodia cotton is grown, only red soils and with facilities for irrigation should be put under the crop, and also heavy manuring advised.

Cotton stalks after the cotton is picked and the tender portions and leaves grazed off, may be converted into compost.

Introduction of new crops.—Among new crops deserving of introduction is the tapioca. It is a valuable food crop and under favourable conditions, can yield some 400 maunds of green tubers equivalent to 200 maunds of starchy food.

It is, as a matter of fact, unique in this respect and should prove a substantial addition to the ordinary grain crops of the State. It is easy to grow both as a rain-fed crop and as an irrigated crop, and can be grown in many situations and soils which cannot be thought of for the usual grain or other crops. As distinguished from potatoes, the seed material of which is very costly, tapioca costs almost nothing.

Another food crop, which though not new deserves to be extended, is the sweet potato. Although it is a garden crop (though it is sometimes grown as a dry crop also) and therefore the cultivation is not so cheap as with tapioca, still as compared with the potato, it involves very much less expense, the seed material especially costs next to nothing. From the point of view of food, both are liberal yielders and serve to materially supplement the food grains.

Others are the cashew and the palmyra palm and Robusta coffee and pepper, which deserve introduction or much larger extension (*vide* pages 192, 193).

X. ANIMAL HUSBANDRY

There is fairly liberal provision in Mysore for veterinary help in the countryside, both for the control and prevention of epidemics and for the treatment and cure of animals. The number of institutions is being worked up to the standard recommended by the Royal Commission on Indian Agriculture and is reported to have reached already about 225 altogether with the prospects of further increase. The functions of the village workers will consist mainly in seeing that this service is fully utilised by the farmers, and that no case requiring attention goes without. Prompt report and securing the services of the veterinary staff will be the essence of their work, in addition to which a certain amount of direct technical assistance of the " Till the doctor comes " order will also have to be afforded by them. A caution which appears necessary (at any rate in my opinion) is to avoid habituating farmers to rush to the veterinarian at the slightest provocation, and to neglect the cheap easily available and traditional remedies which are well known and adopted by the villagers. Such an attitude tends to the disappearance of these valuable and effective local remedies, especially in the face of the flood of new specifics and synthetic products which are multiplying rapidly, the same being pushed with all modern aids to business expansion.

In respect of cattle improvement the supply of high class breeding bulls for service will be the chief concern. Private breeders generally help themselves and own excellent animals which are availed of in their respective neighbourhood, but the number is very inadequate and Mysore has tried many schemes in the past to provide a more extended bull service. Bulls have been stationed by the District Boards in the old days at veterinary hospitals which however were few and far between in those days; private breeders were encouraged to keep them and were paid an annual

subvention therefor; villages (panchayats) were supplied with bulls free of cost which were kept in the villages to roam with the cattle and were replaced by another bull after a couple of years; a system of itinerant bull service in which the bull was taken to the villages in a circuit on specified days was also tried, although it aroused much good-humoured ridicule. Things have changed now and with so many veterinary institutions, the stationing of a bull in each of them is likely to prove of very great use and this step should be adopted without in any way relaxing the concessions in the supply of bulls to private breeders as in those days.

An integral part of this branch of cattle improvement is the castration of the scrub bulls in the villages. Veterinary officers have generally shown much zeal in this work, sometimes more than might be considered good for the cows of the villages, because the supply of good breeding bulls lagged far behind. The two should of course go hand in hand; and the village worker's function in this line will lie mainly in giving his active co-operation to the veterinarian when he should visit the villages for the purpose.

It must be remembered that the State of Mysore supplies draft cattle all over South India, Southern Bombay and Hyderabad, and that the cattle trade is estimated at Rs. 5 crores in value per year and that the animals bought and sold belong to the famous Mysore breeds, Amritmahal, Hallikar and the Mahadeswaran betta. Nothing should be done or thought of which may prove detrimental to this trade, by breaking this type and by the infusion of the blood of foreign breeds, by means of artificial insemination or by natural means. The countryside should be kept a close preserve for the local breeds, whatever may be done in and about cities. The bulls kept in the veterinary hospitals and those supplied to private breeders should therefore be pure bred bulls of this type and none other.

Artificial insemination may of course be adopted also, as it has advantages, especially as a matter of economy as

against the maintenance of bulls, but the semen used should be scrupulously that from bulls of this type. Trained staff may go about the villages with the necessary kit and inseminate such cows as may have come into heat. It is a great convenience, as it avoids the need for owners to bring their cows to the bulls wherever they may be stationed, with the possible delay and overstepping of the correct stage. Of course what effect eventually the method will have on the cow population in the course of a few cattle generations cannot be said, but meanwhile it is being taken up all over the world, and we shall certainly be in safe or at least good company.

No permanent improvement can however be secured by breeding alone, and the provision of adequate feeds of the proper kind is an indispensable auxiliary. The growing of fodder crops is a supreme necessity, and village workers will have an important duty to perform in persuading ryots to put down small areas of their land under fodder cultivation. It is being done to a certain extent but it is nothing to what is required. The practice should come into vogue not only in the dryland fields but also to some extent on the wet lands and those under well cultivation. Fodder jola is the crop usually grown for this purpose, but other grasses more or less permanent like Guinea grass, Rhodes grass, etc., and legumes like the various pulses, sann hemp and even lucerne can be grown and should be encouraged. It will be a very great improvement achieved if the work of these officers should result in its being generally adopted.

Dairying, the other important branch of animal husbandry and poultry keeping have been already dealt with (*vide* pages 69 and 70 respectively).

The practice of making hay and silage deserves to be introduced in order to mitigate the fodder difficulty. Village level workers should encourage villagers not only to grow fodder crops but also to adopt the above two practices. In the rainy season and thereafter especially in October, November there is a lot of grass growth in the waste lands and forests, and ryots should be encouraged to visit the places, cut and

cart the grass to the villages to be dried into hay, if possible, or if the weather will not permit it, to convert it into silage. For the latter purpose a lot of edible leaves of certain trees and shrubs which serve to mix admirably with grasses for making silage should also be gathered and brought. In the malnad of course there is a huge surplus of grass available in the season together with other edible material like leaves and creepers, and there should be no difficulty in procuring as much as can be handled. At one time this was one of the improvements being popularised by the department, money grants were made to cover expenses and prizes too awarded. The popularisation deserves to be revived and extension officers should actively work for its being taken up on a large scale.

Where fodder scarcity prevails, as it does frequently in the Kolar and Tumkur districts, ryots trek in gangs to distant *borés* or uplands with a thin struggling growth of hariali grass on them, scrape it up root and all with their large *kuntes* or bladed harrows, and cart the precious material home. The work often led to affrays between competing villagers to stake out claims and fight for this none too nutritious grass. If they can only be persuaded to undertake similar journeys during the grass season, their work will be rewarded many fold and they can all bring back cartloads of green grass and edible leaves, in sufficient quantities to save them from the usual expedition in the hot weather, with its scanty results and the risk of broken heads.

Sheep.—Mysore is a great sheep country, and has a respectable volume of wool production for export outside the State and for the local manufacture of *cumblies*. There are also villages the sheep from which are noted far and wide for the quality of the mutton. The improvement of the local sheep has now formed almost a major activity of the livestock department. The idea is really very old; Tippu Sultan is said to have stationed in front of his palace rams of superior breeds for the service of local ewes; the Chief Commissioner Sir Mark Cubbon maintained a

sheep farm at Heraganahalli, in the Nagamangala Taluk, imported Merino rams regularly every year from Australia for crossing with the local ewes, and distributed cross-bred rams from the farm all over the State; the quality of the sheep in many of the taluks at present is traced to his efforts in those old days. The farm was wound up in 1863 but subsequently also Australian rams and even ewes continued to be imported off and on for improving the local breed. The present activity in sheep improvement is also due to a Deputy Commissioner who was keen on weeding out black sheep from all local flocks (as indeed he might well do from his subordinate staff) and to see that only white sheep are bred in Mysore, and with whom this was a passion. The improvement at the present time has likewise taken the form of the introduction of foreign blood, almost solely of Merinos (but with an occasional dash of superior Indian wool breeds like the Dumba and some English breeds). All manner of difficulties have had to be overcome in this work, principally in acclimatising them here. Mortality has been terrific and rams imported at great cost died off one after the other in quick succession. Out in the farms rams would simply go and seek shelter under the shade of a bush, panting for breath in the heat and would not look at a ewe, whatever her charms or condition. Nevertheless a few of them really did the duty expected of them and quite a large herd of cross-breds has been raised after persistent efforts; my experience with one ram which was sent out for service in a village has already been related. Large herds of cross-bred animals with varying proportions of Merino blood in them but all sharing in the large size, white colour and the quality of the wool have been raised, a Breeders Association has been formed as an auxiliary, which attends to both the multiplication of these sheep and the utilisation of and marketing of the wool. The use of a clipping machine instead of hand shears for shearing the sheep has also been introduced which is also being popularised by the association. Animal Husbandry officers can

be expected to further this work along suitable lines in the villages or special suitable areas and, as in other matters, the extension officers in the villages will be responsible for actively co-operating and helping in this work.

As in the case of cattle, proper feed will have to play a big role; without it the improvement will have little or no chance to show up, nor for it to become lasting to any significant degree. Individual villagers who keep one or two head can be trusted to attend to this matter, but the difficulty will be for the herds. Probably considerable scope in this respect may be found in the villages situated in areas commanded by the large irrigation projects, provided the control of the ' liver fluke ', to which sheep are very subject in these areas is effectively and systematically attended to.

XI. TREE PLANTING

As is well known tree planting has received great attention in the past, from rulers, village communities and individuals alike as is evidenced firstly by the stately avenues on all the main roads, the village topes, the plantations of fruit trees and the innumerable trees in one's and two's of individual owners. In addition to their amenity value as shade trees affording protection against the sun for pedestrian travellers and a restful cool haven for all, on account of which indeed the planting of trees has been included among meritorious acts of public charity or service, they form an invaluable material source of profit, as in most cases avenue trees comprise not only mere shade trees but also those yielding valuable produce like tamarind, mango, jack, *ippe* (*Bassia latifolia*), *honge*, and sometimes even cocoanuts; private plantations are of course purely for the sake of the produce, generally mangoes in most parts of the country. In addition to these specially planted trees there are those which grow and regenerate themselves naturally as in forests, uncultivated Government or private waste land and which afford a variety of produce and yield themselves up in any case finally as much-needed fuel. While in the case of private owned plantations and individual trees, owners take care to guard and protect them, and their right is also respected, in the case of the avenue trees and others on common or government land, they have to be protected only by the fear of punishment. So effective has been this fear that not a soul would dare to touch them, and it used to be a common sight to see villagers who may clandestinely resort to lopping branches scamper away at the mere sight of a turbaned head, or a cart or car in the distance. Those days have gone and the maiming and mutilation of avenue trees now goes on merrily and with perfect immunity. Government is as little feared by these

tree slaughterers as King Log was by the frogs in the fable. Where stately and precious trees once stood, one sees now maimed and crippled stumps, which are also coming under the axe. This destruction and loss must be colossal in the aggregate, and even if the destruction is stopped immediately and new planting started, it may take quarter of a century to restore the old condition. The tragedy is that thousands of heavily bearing trees of tamarind, mangoes and other profit-yielding trees have disappeared. Private owners too have not hesitated to cut down their old trees for firewood or charcoal and many ancient giant trees have gone. It is stated that old jungles of impenetrable thickness have been so badly cut down that they can be hardly made out now. All this dare devil vandalism is of course a measure of the scarcity of firewood or charcoal and of the high prices they fetch and the consequent inducement for indiscriminate felling.

Fuel plantations under the new irrigation projects.—Already the destruction even in the forests has gone on at a rate far exceeding even the most hopeful rate of regeneration and the problem of meeting the demand for fuel to a fast growing population, mainly urban, has become very difficult, and a solution is both important and urgent especially in view of the unprecedented destruction which has taken place within the last few years. Nothing but a policy of large-scale tree planting combined with a stricter control and conservation of the existing forests can solve the problem and it should be such both in the location of the plantations and in the kind of trees to be planted that comparatively quick results may be expected. It may be mentioned that in Mysore proposals were considered and sanctioned some years ago for the setting apart of large blocks of land in the V.C. tract for the opening of fuel plantations, under the control of the Forest Department. The selection of the area is significant, because it is an irrigated tract and affords much better and favourable conditions, for the plantations cannot only be established with certainty but also grow

vigorously. The plantations were to consist of casuarina trees, which are admirably suited for such cultivation both by their habit and by their high fuel value and which are accordingly grown largely in the country already. I am afraid that practical action has not been as prompt or adequate as it was expected, chiefly because of the slow, cumbrous and dilatory ways incidental to Government machinery. The point which I should stress however is that, as part of all the main irrigation schemes that are in operation or planned this matter should receive attention, and adequate areas should be set apart for fuel plantations, and that they should be established with promptness and looked after according to the most approved methods of maintenance and regeneration, so that they will be permanent and supply fuel for as long as we may care to think of.

Plantations in the open waste land areas.—The scope for new plantations on the ordinary waste land is probably very limited, although one cannot generalise in a country so large and so diversified in its conditions; and it deserves to be examined at district level and if at all promising areas are available, they should be utilised for starting plantations. The difficulties of raising new plantations are very great and real, especially in watching and protecting them against the raids of cattle, not to speak of the scarcity for water and the poverty of the soil; there is a certain amount of defiance of authority in this matter on the part of the villagers which in recent years has become serious. A couple of forest guards are only efficient as long as authority is feared, but are absolutely useless against the present resort to lawlessness. Fences can be freely cut down, cattle and goats let in and the plantations made impossible with an immunity unbelievable to the older generation. There is in addition the perennial complaint and clamour that forest areas should be deforested and given over for cultivation, which should prove a powerful obstacle to the starting of new plantations. In view of all these difficulties it may be advisable to concentrate attention on the existing forest plantations,

tightening the control and preventing the damage and depredations and paying greater attention to renovating, regulated felling and so forth. In any case the improvement of the fuel resources by one method or another is very important and of the two the latter appears the more promising. It is interesting to recall in this connection that some years ago in Mysore a scheme of tree planting by Government agency under the name of 'waste land plantations' was started, and here and there some fairly large areas were taken up, fenced, nurseries put down, and the plantations commenced. The areas chosen were close to the main roads, and name boards appropriate in size to the schemes also put up, so that in case they succeeded they may not escape public notice and its propaganda value. This was of course with the idea of turning the waste lands to some good account as sources of fuel, the scarcity of which was a burning question even at that time, and affected not only the living but also the dead, because firewood could not be had even for cremation purposes ! The difficulties of raising plantations to which I have referred were not adequately realised perhaps, they had to be met full blast, and the plantations were a wash out; only the waste land remained but no plantation. This may perhaps be considered an extreme case but really the difficulties even ordinarily can hardly be exaggerated.

Plantations under communal or panchayat ownership.—It is a significant fact that the *topes* or groves which form quite a pleasant feature of certain villages and are the common property of the villagers have been flourishing plantations though small. They have not altogether escaped the woodman's axe, and do bear evidence, which unfortunately is increasing, of the mutilation and maiming which has become an epidemic. Still that they have remained in very good condition all these many years, perhaps half a century or more and have even now escaped the fate of the avenue trees appears to indicate that plantations under such communal ownership are likely to yield better results than those

we have been considering. As a matter of fact "village forests" of fuel and manurial value have been frequently considered, but unfortunately have not been pursued with the seriousness which the matter requires. A few struggling newly planted stumps put in in a patch of enclosed ground on the road side in certain villages which are supposed to pass for "village forests" were all that resulted by way of practical action, and needless to say have ceased to exist. This apparently is the fate of many well-meant schemes of improvement initiated by Government and more or less imposed on the people, as distinct from those started by them on their own urge and initiative which are native to the soil, so to speak.

It is possible, nevertheless, that small plantations of trees mainly of fuel value preferably with a free coppicing habit with a sprinkling of fruit or other trees yielding produce of saleable value can be started and looked after by the villagers themselves as common property much in the manner of village topes. In the new administrative set-up the village panchayats are to hold an important place, and given both authority and funds, they may become efficient agencies for undertaking the work. Even now the assignment of the sale proceeds of trees on Government land to the village itself is acting as an inducement to their good maintenance, and this is likely to become stronger with the new addition to their power and importance. The idea may raise a smile among those to whom the factions, corruption and ineptitude in panchayat administration are much too familar and who have become confirmed sceptics about their usefulness, but things are bound to improve and the possibility should not be overlooked. I have touched upon this subject in a later chapter also.

Plantations under individual ownership.—In addition to these two agencies of a Government department and of village panchayats, there is also considerable scope for action through individual agency. This has been far and away the best method and indeed, but for the fuel plantations

raised by individuals on their private land, the fuel problem would have become almost impossible of solution. Large and magnificent plantations of casuarina in Mysore and of casuarina and *korkapalli* (*Pithecolobium dulce*) in the Madras coast raised with great care and on a system of rotation much like a cultivated crop, form a conspicuous feature of the landscape in these regions and supply the fuel needs of the towns and cities in a most substantial manner. In fact in Mysore the practice has given rise to the complaint that the plantations have depleted the sub-soil moisture to an alarming extent, that the water table has greatly gone down, that wells have to be dug to almost double the old depths before water could be reached, and that in the interests of general cultivation the planting of casuarina topes should be forbidden ! The profit motive is of course the driving force behind the putting down of such plantations, in which respect it is similar to any business enterprise. There is therefore no special inducement or concession necessary on the part of Government to stimulate these plantings. From the point of view of the solution of the fuel problem this attitude on the part of the individual is to be encouraged. Mention may also be made of the large *honge* groves raised by individuals on their own land for furnishing green leaf manure for rice cultivation.

Still, government has at least in the past encouraged this effort on the part of individuals by substantial concessions, one of which is the grant of land on *shraya* tenure, that is, for the purpose of tree planting, conditional upon the raising of such plantations and subject to resumption on default. This is perhaps of only historic interest as evidence of the concern of Government in such matters, and although the rules continue to be in force, I doubt if any large grants are being made or any plantation raised as the result. I know on the other hand that it opens out a rather convenient way of securing Government land and the methods are such that it can form an effective screen, especially to one who knows the ropes.

Fruit tree planting by private individuals and encouragement therefor.—The planting of fruit trees is almost entirely a matter of individual effort although to a small extent and incidentally they form part of village *topes* or avenues. Fruit tree planting has been and is being taken up on a remarkably rapid scale in recent years, and is probably an indication of the rising standards of living and of the desire to substitute money crops for the food crops. The extent to which mango cultivation has increased is truly astonishing; solid blocks of mango orchards of choice varieties covering several acres even in the case of single individuals are becoming quite common; and plantings of trees in one's and two's must be legion. Though mangoes are the general favourites, oranges, guavas, sapotas, etc., all share in this hectic fruit tree extension. If moreover we include the planting of cocoanut trees also under this head then the activity must be regarded as phenomenal. As regards the poor man's fruit which is generally available throughout the year, *viz.*, the plantain there has been also striking increase in the cultivation which has followed mostly in the wake of irrigation under all the big irrigation schemes especially where water has become assured more or less in the hot weather also. Time was when plantains of the cooking variety used to be a rarity in Bangalore and green leaves for use as eating plate could not be seen in the market, and special efforts had to be made to get them from distant places during particular religious functions and ceremonies; but now the market is simply overflowing with these products. Similarly the most striking change I have seen in the village *santhés* and in the interior towns is the sale of oranges in cartloads in the former and in all street corners and stalls of the bazaar in the latter, while in the cities oranges are brought in lorry loads, the fruit stalls overflow and basket-men and handcart men do a brisk business in every street. There is no doubt that a most welcome and significant change for the better has taken place by the large-scale increase in the cultivation of these fruits. What needs to be stressed in this connection

is the decisive part individual effort is playing without the need for any particular stimulus on the part of the Government and the great awakening in fruit-mindedness which has taken place. In Mysore the assistance of Government especially in regard to the grant of land and loans for the special purpose have been considered and rules have been framed therefor, but I doubt if many people availed themselves of these loans with all their conditions of repayment, etc., and submitted themselves to be tied up in Government red tape.

The scope for Government and the extension staff lies in the following directions: (1) The supply of plants for planting whether grafts or seedlings, of guaranteed quality and at convenient centres either by its own agency or by a system of licensing nurserymen. There are a large number of commercial nurseries who supply practically the whole demand, and some of them both from Bangalore and from Madras are so enterprising that they have a system of peripatetic service, which visits the countryside with a large supply and sells plants from convenient centres. The trade is of considerable magnitude and, as is generally the result, the quality of the plants supplied is not uniformally the best. Moreover efficient and timely as the supply is, there is still some room for Central Government Nurseries, say, in the district towns, from where plants of guaranteed quality can be supplied all the year round and also a greater variety of fruit plants can be made available than the mango grafts which form the bulk of the trade. As it will be an impossible task and almost unthinkable to substitute a Government agency for the private agencies, a system of licensing the latter has been suggested which will guarantee quality. The suggestion is worthy of adoption and I believe it is being introduced in respect of certain kinds of plants already. (2) By popularising improvements in cultivation methods. There are a good few points in respect of the cultivation methods, irrigation, manuring, etc., common to all field crops, but, also special to fruit plants such as grafting of

branches and of roots in which improvements are possible and useful guidance may be given and which will therefore afford considerable scope for help by Extension Officers. It must be emphasised however that some of these especially the pruning of grapes (or of apples if these should be attempted also) and other aspects of fruit cultivation require special knowledge and experience and a little knowledge is a dangerous thing which may land one in awkward situations. It is true that agricultural graduates do receive some amount of training in horticultural practice but unless they have had occasion to improve it by further experience they should be careful about attempting such work. It will be indeed well to have men available for this work at the central nurseries referred to above and when necessary to get their help in such work. (3) By adopting measures for preventing or reducing damage by pests and diseases which not only bring down the yield but threaten even to kill out the plant, through an efficient control service which will promptly conduct the spraying, dusting or other known methods of control, keeping always in readiness all the appliances and materials required. By far the greatest scope and need for the assistance by the technical staff lies in this direction of controlling pests and diseases. None of these fruit crops are free from this danger, in fact they are, if anything, subject to more of them than the ordinary field crops and the damage too is greater. The mango is subject to mildew and the hopper pest and trees loaded with flowers and promising a bumper crop suffer an almost complete drying up or shedding of flowers resulting in almost total loss of crop. The grape vine suffers from mildew in a serious form and whole bunches become affected and useless. The fig is subject to a leaf rust and fruit rot which result in no fruit setting or none ripening normally but rotting off and dropping. The pomegranates are attacked by the fruit-boring butterfly grub, which hardly leaves a single fruit sound while larger enemies like squirrels, play havoc with the fruits. The oranges are subject to a serious yellowing

of leaves, 'Frenching' or chlorosis, by a root rot, by borers, by a leaf and stem scab which not only weaken the trees and reduce the yield but eventually kill them out. Even among plantains which are fortunately free from many pests or diseases some varieties like the choice one '*rasa bale*' suffer from a stem rot which attacks well-grown plants and causes them to rot and break down either when they are due to flower or even after the bunches appear. Fruit flies play havoc with practically all kinds of fruit though luckily the plantain is free from their attack.

No help or service by the extension staff will be more appreciated and serve at the time to make them popular with the villagers than the successful control measures they may adopt. Fortunately for most of these pests and diseases effective remedies are already known and it only remains for the officers to apply them wherever necessary. There is indeed no excuse for any inaction or lukewarmness in the matter and there is no reason why what is being done for the 'koleroga disease' of arecanuts and the leaf disease of coffee in Mysore and the grape mildew disease in South India should not be copied for other diseases and pests. Proper large-scale spraying outfits, with hoses long enough to spray large areas of heavy leaf canopies like the mangoes or the use of tall moveable platforms from which to apply the spray, and other suitable devices can be adopted successfully and big crops protected and saved from loss to growers. An efficient and adequate plant protection service is an urgent necessity and should be provided. On a small scale, ordinary sprayers and dusters should be available in the villages, which can be worked by the village level workers or by the growers themselves; a good stock of the common insecticides and especially the newer ones like D.D.T. insect powder, gammexane, and the ingredients for fungicides like Bordeaux mixture, should also be kept in readiness, so that the remedy can be applied promptly on the onset of the attack. Complaints are frequently heard that timely spraying could not be done, because such stocks were not

available—a shortcoming which could easily have been avoided.

What has been said about pests and diseases of fruit trees applies to nearly all the vegetable crops also, and help of a similar kind is needed in this case also, which will be likewise greatly appreciated. I recently came across one Agricultural Inspector at least who was a live wire in this respect, going about the village gardens, drawing the attention of the owners to the attacks by various insect or other pests and diseases and getting them handpicked or sprayed or dusted, on the spot with the hand sprayer and materials he carried with him or supplied for the purpose. I think he was a popular individual whose visits were always welcomed. His example is a pointer to others, who cannot do better than copy his example.

Improvement of indigenous fruits.—While on the subject of Government help in the extension of fruit cultivation, reference may be made to the need for starting the work of improving some of the local fruits, of which there is a great abundance and the trees of which grow with great ease and luxuriance and do not require the care, attention and nursing of the pest and disease-ridden foreign and other fruits. Most of the different fruits in modern horticulture in the west like apples, pears, peaches, grapes, strawberries, etc., owe their present excellence to the work of plant breeders, who may be only ordinary growers keen on such work if not highly trained specialists. In India with the exception of the mango, in the case of which the art of grafting has resulted in some of the most luscious varieties of this kind of fruit, little or nothing by way of improvement has been done in respect of other fruits. As examples there is the wood apple (*Elephantum correa*), which can be improved into a seedless, early maturing or sweet fleshed kind; there is the jambu (*Eugenia jambolana*) fruit in which it may be possible to breed the stone out into one of diminutive size with proportionate increase of the flesh. There is the country zyziphus (bér) the champion ' all stone

and no flesh' fruit, which can similarly be improved into one of almost 'no stone and all flesh' kind. There is the sitaphal (*Anona squamosa*) which grows wild and in great abundance, which can also be improved in size, flavour, and sweetness. Other examples may occur to readers in different parts of the country. These are all indigenous to the country, quite free from many of the troubles attendant on foreign introductions, and may with great advantage be improved by cross-breeding, grafting and other methods familiar to the plant-breeder. It is work which I think is very promising and long overdue, and which should be taken up by the horticultural specialists of the Government.

(4) The encouragement of what may be called backyard planting. Villagers or townsmen who may not be agriculturists may still have a little open space by way of a compound, or backyard, or open yard within the house itself, suitable for the planting of one or more fruit plants, and be willing to grow them. If this is made possible and easy for them it will mean that practically every householder will have a fruit tree and a crop of fruit however small for his own needs, the fruit tree chosen being of course such as will suit the space available. The domestic waste water from the kitchen and bath room will often be found to be ample and the household wastes and sweepings and sullage may help in supplying part of the manure. Even if the space be too little for a mango tree, smaller ones like a guava, fig, or pomegranate or a grape plant or papaya or even a few plantain trees can be thought of and any of them put in.

In fact in many a Muslim residence in some parts of the country, the tiny courtyard inside the house is occupied by a grape vine and the overhead frame (*pandal*) on which it is trained; remarkably heavy crops are raised due largely to the kitchen wastes (which comprise much animal matter in such houses) which are regularly applied to the vine. The custom is so general in these villages that the area is a noted exporting centre for high class grapes. Elsewhere

a fig (not the country one) tree or a couple of pomegranates can be seen in such houses with equally remarkable crops; others like papaya simply luxuriate with masses of luscious fruit. To a small household these form a substantial source of income; even otherwise they add to the enjoyment of life, humble though they may be, and enhance the value and taste of the ordinary menu, which is often coarse and poor in all conscience. All this is achieved at little or no cost and the work is admirably adapted to the womenfolk of the houses, especially if they should be *purdahnashins*. Both propaganda and help by way of supply of plants, technical assistance in the shape of pruning, fighting pests and diseases and other encouragement are called for to spread the practice and the extension staff should find ample opportunities for their service in such work.

Tree planting campaigns.—Off and on, it has been customary to make tree planting on a large State-wide scale a kind of ceremonial part of the celebration of important events, such as a jubilee of the rulers, a great victory, the birthday of some great personage and so on, on which both Government and the citizens are enjoined to plant trees. Sometimes seedlings may be supplied free of cost or other concessions shown. It may be remembered that recently a great countrywide campaign of tree planting under the name of Vanamahothsava was organised and both individuals and districts and States were made to vie with each other in the number of trees they planted. Great enthusiasm prevailed and many lakhs of plants and cuttings were reported to have been planted. Many a district or State beat the others and captured the pride of place and the material token of appreciation attached to the honour.

These campaigns being started under the ægis of Government become a sort of tree planting to order and naturally an immense number is put down, but anywhere and anyhow, with scarcely a thought about keeping them alive. Much of the result becomes a mere make believe affair and not at all commensurate with the trouble taken or the

money expended. In fact a member from Kolar in the Mysore Assembly complained in the latest session that though his district stood first and won the all-India shield during this *utsava* very few of the trees were living. Reports one reads or hears from other places are more or less of the same character, and this is usually the fate of such campaigns. Funny stories may be heard of former attempts of this kind and of enterprising Amildars who raised smiling green plants overnight all along the route on the roads which a boss, keen on avenue trees, was to pass along in the following morning—plants on whose fate nobody bestowed a thought after the cavalcade had passed ! It is well to recognise the difficulties of raising trees and plantations, to start schemes only with all the requirements suitably provided for, blocks being selected with suitable soil, water facilities, fencing and watch and ward arranged for, and put the whole execution in the hands of the forest or horticultural department. Only then can the results be tangible and lasting and proportionate to the efforts made. It is easy enough to stick a greenwood stick or a seedling plant in the ground but to nurse it and water it and protect it and keep it alive and growing are difficult matters. A survey if undertaken to assess the result of the campaign will reveal the dishearteningly small proportion of the plants which may have survived and furnish a measure of the huge fruitless efforts.

Leaving this large-scale drive apart, as far as the village-level workers and the ordinary villages are concerned, there is a certain amount of work in tree planting for which there is both need and scope. Firstly, it may be noted that many villages are without any good shady spots in or around them, and are practically treeless. One or more specimens of quick-growing shade tree like the Rain tree, if planted and looked after till it grows up will afford magnificent shade under which both men and cattle can gather and rest. Even a single tree planted at the entrance to or anywhere close to the village will afford shade like a spacious green arbour. If a group of them or even a few can be planted and raised,

say in the open ground where cattle are herded before they are taken to grazing, they will develop into almost a green canopied reception hall, and add materially to the comforts and amenities of the village. It should not be difficult at all for these officers to persuade villagers to undertake the work. It may be added that the fruit pods of this tree form excellent cattle feed which are eaten greedily as they fall and strew the ground.

Secondly, if there should be Government waste land available near the village, it may be planted up with a dozen or more (or as many as may be possible) eucalyptus trees; if the species selected should suit the soil the plants will grow into gigantic trees of considerable fuel value, and the grove as long as it remains intact will prove an attractive and health-giving feature. The plants are not touched by cattle, so they are free from one main difficulty in raising trees and do not involve therefore special efforts in protection.

In both these directions there is ample scope and the villagers are also likely to heartily co-operate, so that a lasting and much appreciated monument will be left to the beneficent activities of these schemes of village improvement.

It may be useful to note in this connection that in the New Jewish State of Israel, it is reported, school children are made to take an active part in the State afforestation plans. Particular areas conveniently situated are assigned to each school, and these sections are planted by the children themselves, *who in addition continue to give them all after-care necessary, until they become well established* as regular plantations bearing the name of the particular school concerned.

In the malnad Robusta coffee and pepper, and in the maidan and malnad country the cashewnut tree, are worthy of introduction and extension where they already exist. All three yield products which are already greatly in demand, but in which the supply is not enough to meet the demand; their products are moreover very high priced and very much

in demand in recent years and being largely export products are great ' dollar earners '. There are large areas both in the Mysore and the malnad districts of the west coast where they can be extended. The cashew is already grown both here and in the eastern districts as well and in all these regions they deserve extension. Of course they should be recommended to individual landowners who may be expected to look after them, bestow the necessary care and attention, both in the early stages till they come into bearing and later on as well. The Extension Staff in such districts should find much scope for useful service in the necessary propaganda and help towards this end.

The palmyra palm as a suitable tree for planting in lines along the margins of dry land fields is worthy of being introduced, especially in the Mysore State where it is grown only to a negligible extent at present. It is a tree of many-sided usefulness and yields raw materials of cosniderable value and in the districts of South India and in the northern circars where it is very largely grown it is a source of great profit and furnishes much material for spare time occupation among the people. Its habit of growth is such that its root system cannot affect the crops, even near the margins. The planting should be easy as well, because in Mysore the dry land field margins are very wide and ample on all sides. It is altogether a very desirable introduction.

XII. MODEL VILLAGES

The idea of working up selected villages and introducing as many of the elements of village improvement as possible into them, so that they may serve as model villages which would impress others and stimulate them to do likewise for their own villages has been a favourite one, and off and on the subject is mooted, and to some extent practical action has also been taken in the past to bring them into being. Village streets were to be straightened, and metalled if possible, approach roads made, pits and mounds in and around the village to be levelled up, a school house constructed, or improved, and provided with a reading room and library, village approaches cleaned, a co-operative society started, improved ploughs and other implements to be introduced as well as cultivation by improved methods suited to the crops of the village, one or more drinking water wells dug, a good breeding bull kept, some cottage industry started or improved if one is already being followed, and so on, in fact the different development departments were to concentrate their efforts in a few villages rather than spread themselves thinly and with perhaps little result to show over a whole taluk or district. The enthusiasm for village improvement and the scope for a self-less worker was so great and catching that it inspired a talented young lady to come out with a book on the subject depicting the doings of a young hero in the cause, entitled "Ramachandran or Village Improvement". Under the name of 'Key' villages the idea is now being mooted again, for it has really much to be said in its favour.

The snag is that, at least in the old days, little could be achieved because it was mainly a question of finance which the villagers could not afford nor the Government supply. The enthusiasm of the villagers whipped up by the authorities could not make up for the insufficient funds, and the

inertia coupled with a cessation or slackening of the drive did the rest to restore the *status quo ante*, so to speak. It is possible under the new set-up and under the new name better results can be achieved, because for one thing money is plentiful. It may however be found that other villages may complain that they should be served too, and the departmental staff may not have enough to do in a single village or the very limited number of villages which may be constituted as a 'key' village centre.

I may relate in this connection that a former Registrar of Co-operative Societies with whom I used to work rather closely was very keen on starting societies and worked hard to see that practically every village and town had one or more societies. It was the beginning of the movement and pitfalls and working difficulties were many and unthought of to which many were likely to succumb and did succumb. It occurred to me that a better plan would be to concentrate on a few and nurse them into sound institutions rather than multiply their number, and suggested the course to my friend. This 'key' or 'model' village mentality did not appeal to him, because he said he knew many would succumb and that was the very reason he started so many, so that allowance could be made for these inevitable casualties! On the same analogy, as a provision against such 'infant mortality' it may perhaps be better to tackle a number of villages and achieve such partial success as may be possible than to concentrate on a few paragons which may after all not come up to expectations, if not prove failures.

PART IV

XIII. THE ADMINISTRATIVE AGENCY

The agency or machinery through which the various schemes and measures can be carried out efficiently, smoothly and speedily, is a matter of the highest importance and requires careful thought, so that it may on the one hand satisfy the enthusiastic expectations of the idealists who may be all for hustle and speed and on the other meet the practical administrative standards of executive officers who have to take note of all possible obstacles and weaknesses in respect of the materials they have to work with, whether men or just brick and mortar and abide by prescribed rules, which may seem too slow. The subject has been touched upon here and there in the foregoing chapters with reference to particular items of economic development and rural improvement but it has to be dealt with separately and at some length, which will now be attempted.

The Economic Conference of Mysore.—It will be obvious that the whole range of these developments comprise two stages, *viz.*, (1) what may be called the deliberative and (2) the executive. In the old Economic Conference Organisation in Mysore the deliberative part consisted of Committees at the district and taluk levels, in each case presided over by the Head of the district and of taluk respectively, and included the officers of the development departments and selected non-officials. The organisation was practically in the hands of the Revenue Department, the Head of the district or taluk being responsible for the work. Among other things, these bodies examined the economic needs of the district as a whole and as related only to the taluk concerned, catalogued them, arranged priorities, fixed targets and devised ways and means for their execution. Their activities covered both the district and the taluk needs and their list of the needs related to not merely what was possible immediately but what could be taken up only in course of

time. Certainly one important part of their work was this survey of the needs and possibilities in the field of economic development in their respective spheres. At the top of the organisation was the Economic Conference itself, with three separate committees for Agriculture, Education and Industries and Commerce. The programme of activities, which was an expanding one, was very ambitious, comprehensive, and the greater part, far in advance of the times; but some at least of them have been accomplished and have developed so much that they have far exceeded the expectations of their sponsors, such as for instance, the University of Mysore, and the Bank of Mysore, to mention only two among them. A much larger number however still remain only for the future. There was practically no subject under the sun, it used to be said, which this body did not include in its programme and deliberate upon and on a number of which some action was not taken. Probably one reason at least for winding up the organisation was the immense load of its programme both capable of early realisation and those which were only remotely possible which it had to carry; a jettisoning perhaps of part of the cargo would have prevented it from floundering.

Alongside this ambitious programme of province-wide application was a village level programme also, under the name of the Village Improvement Scheme, which dealt with the many aspects of village life with a view to promoting the welfare of the village folk in all the many directions, with some of the most important of which we have dealt at some length. In this field also a great many things were attempted with partial successes and numerous failures, mainly because of the complexities and the interdependence of the many factors involved, and the inadequate funds, personnel and attention; one of the kind of dangers against which we are warned by Mr. A. D. Gorwala, *viz.*, planning ahead of men and money.

The National Extension Service and the Community Projects may be said to be more or less closely similar

organisations with the same objects, so much so that it looks as if the old Mysore Economic Conference has risen Phœnix-like from its ashes. Much of the experience gained in the past may have useful application in the present organisations also. There are however significant differences all of which should tend to a more successful realisation of the objects. The first and foremost is the very restricted area comparatively, in which these are to operate. They comprise only a taluk or two, as against a district or even province-wide sphere of operations of the older ones. The staff provided for these restricted areas is many times more than was available for a whole district in the old days, so that with a small sphere of operations and a large staff, work should be more intensive, and with a much greater chance of success. Above all the funds provided are on a scale which could not even be dreamt of in those days and with this liberal provision of the sinews of war, the campaign must succeed as far as is humanly possible. There is however one important *proviso*, *viz*., that the people concerned should co-operate and contribute funds or labour or both, so that whatever may be accomplished will be the joint result of the contributions made by the villagers and the Government and not a kind of charitable benefaction by some outside donor. This aspect of the matter lifts the aims and objects of the schemes on to a higher plane altogether, which should appeal to the pride and self-respect of the people. All these distinctive features mean invaluable aids, and if these are fully and wisely made use of, a higher standard of life both for the individual and for the community or a veritable regeneration of village life should result. With the creation of new resources in the shape of irrigation, more profitable agriculture, small-scale industries, and above all better health and freedom from malaria and other diseases, it should be possible to keep up the new and improved standards, which will certainly provide a sufficiently strong motive to do so.

Methods of work.—These are all distinctive features, but the method of work can be practically the same as prevailed formerly, and may now be considered. The first point will be the association of the local officers of the development departments and the head of the taluk or taluks concerned, or in the case of a group of villages, of the taluk in which they may be situated, along with a few non-official representatives of the taluk or villages taken up, who will naturally include the members of the legislature representing the constituency. The most important officer will be the head of the taluk or a revenue officer of a higher standing like the subdivision officer, in case more than one taluk is comprised, and all of them will be under the control of the head of the district. This prominence given to the official element may appear of doubtful value and to be rather antiquated in the present democratic administration, but from the point of view of getting the work done it will be about the best. After all the official is the instrument of the Government and as Mr. Gorwala observes, " All concerned must recognise that there is no way of doing without the government servant. He is essential and has to stay. Without him the work of the government cannot be done " (Report on Public Administration, by A. D. Gorwala). And this, I should say, notwithstanding the fact that their powers or influence are nothing to what they used to be. Sentiment therefore will have to give place to the requirements of efficient work.

(1) *Official.*—Coming to the agency for actual execution, it should be obvious that the work contemplated falls into two classes, *viz.*, those which are permanent and more or less final, and those in which there is no finality and which have to go on every year. To the former category belong items like the repairs and restoration of tanks and canals, the making of roads, bridges and culverts, the sinking of wells, the construction of buildings for schools, hospitals or village halls, *i.e.*, those which are usually taken up by the D.P.W., and in the second category come the

measures for the promotion of village health and sanitation, and the introduction of improved agricultural practices, like the use of new manures, seeds and implements, measures for the control of pests and diseases, veterinary and cattle improvement measures, educational and cultural improvement measures and so on. There is no reason why those of the first kind which are to be carried out by Government agency and in certain cases with the contribution of money or labour by the villagers, should not be taken up and finished within the least time possible, if only to demonstrate the benefits which are intended to accrue. The utilisation of the local labour will not only dispense with the need for importing any as is the practice with D.P.W. work and contractors, but will help the quick execution of the works at a pace unthinkable with outside and the *mamool* labour, as has been demonstrated in a number of similar cases. Much is attempted to be made out in this connection, at least as a publicity measure, of the voluntary labour which groups of students or boy scouts from the towns render in these selected villages in the making of roads, cleaning up of village streets and even in the construction of village houses. This is no doubt a very good corrective to the general reluctance on the part of the educated classes to do manual labour and certainly reflects credit on them for this striking evidence of their spirit of service. In the present context, however, it is only a gesture, though a noble one; as a regular trained agency it cannot of course be thought of, and its value lies in the stimulus which it may give to the villagers to follow their example.

Still it has an importance all its own, because it serves as an example to every one in the village, however high placed he may be, that manual labour is not to be despised and nobody should consider himself too high to lend a hand. As a matter of fact at a very early stage in the Village Improvement Scheme of the old Economic Conference in Mysore, it was found that several people in the villages would not take part in the communal free labour, because they belonged to

a higher caste or were too respectable (?), and a demand was made that compulsory legislation should be passed so that every one would contribute either labour or its equivalent in money. The same situation is likely to arise at the present time and the same demand is likely to be made, much as it is to be deprecated. The example of these young men, most of whom belong to the best class of society, will serve to effect a change in people's attitude, and let us hope even make legislation with all its ugly features unnecessary.

The second point relates to the ascertaining of the needs of the areas, or the actual items of improvement work which should be taken up, a sort of cataloguing to which much of the initial attention was given in the old days, and which one presumes is being copied in the new projects and schemes. The importance of this itemising cannot be overestimated; it avoids much delay in taking up the works, much discussion as to priorities which is a matter in which the interests of the constituent villages may not be identical and divergent views may be strongly urged by members belonging to them; it secures the quick availability of the finance, by bridging the time-lag between the budgetary sanction and the administrative sanction; it furnishes the people with correct information as to what benefits are expected to accrue, a sort of blue print of the items to be taken up and their order; and finally it enables the quick and efficient distribution of the various items among the executive officers of the departments concerned.

Strange as it may seem, very curious and almost ridiculous differences in attitude may prevail sometimes in deciding the sphere of each. I recall, for instance, in the old days when sugarcane milling by power machinery and jaggery boiling on a multiple furnace was being popularised, the Department of Industries clashed (not without sparks flying) with the Department of Agriculture, as to who should run the show. In the matter of well-sinking too, the Department of Industries, the Department of Public Works, and the Agricultural Department were all three claimants, in

fact all three had a go at it and the baby was handed from one to the other almost in the above order! In respect of the cultivation of the potato, a similar clash arose between the agricultural and the horticultural departments. Even in a small way, in the same department the chemical, entomological and mycological sections would each urge that the field or extension work of each section should be attended to only by them and not by the general extension staff. Even now the spheres of the veterinary or animal husbandry department and of the agricultural department may overlap, so likewise perhaps the medical and the public health departments, and a delimitation may have to be fixed, which may be acquiesced in by both sides. In the preliminary survey and discussion of the needs referred to, all such cases of possible friction can be ironed out and both harmony and co-operation secured.

Believe it or not, the lack of co-ordination seems to continue even to this day, for we see it reported "But co-operation from other departments like . . . . is not forthcoming in adequate measure. Tendencies in different departments to get the credit of any achievement is one of the reasons for this lack of co-ordination". (Evaluation Report on the Mandya Extension Project, May 1954.) This method of a preliminary discussion in order to ensure this co-ordination, among other things, would seem to be all the more necessary.

(2) *The village panchayat* (suitably strengthened).—The second class of work which is continuous and concerns to a great extent the day-to-day routine of the village and its varied agricultural activities, has to be in the hands of the permanent residents of the village, assisted and guided by a paid extension executive. No better organisation can be thought of for this purpose than the *village panchayat* notwithstanding the well-known defects and weaknesses of the organisation, and this agency has to be improved and sufficiently well-organised for the efficient discharge of this work. This is fully recognised in respect of administrative matters, and of public health and village sanitation, and these come

within their obligatory duties. At present the development matters are relegated to the optional class of their functions, but have to be included among the former in view of their importance, in a 'welfare state'. Moreover in all the various conferences on the working of the Panchayats, the lack of sufficient funds and of adequate authority have been urged as the chief reason for their unsatisfactory condition and their lapses in carrying out these functions. These are matters of fundamental importance, and no doubt will have to be adequately provided for, by assignments of various types of revenue, by means of specific grants and by the power to levy taxes, if necessary. They also lack sufficient authority as village law courts for deciding cases of particular classes. The fact that there is no finality even in these petty matters of village administration in their decisions or resolutions and as the aggrieved party always thinks of his lawyer and a higher court to revise—or at least to dispute their decision, is a strong disruptive factor in their autonomy, and many of these latter will disappear if it is known that the village decision is a settled fact.

Corruption, self-aggrandisement and improper use of Panchayat funds are the pabulum of the complaints against them. It is extraordinary that when in the city one sees tarred roads, cemented pavements, ornamental squares and bunch lights spring up in front of a minister's residence soon after he attains this eminence, and nobody cavils, whereas if a petty village Panchayat chairman has a street light put up in front of his house it becomes a heinous sin. After all the Panchayat chairman and members are permanent residents of the village and their actions are constantly under the critical if not cavilling gaze of their fellow villagers, and irregularities and high-handedness cannot continue for long. For serious offences there is the arm of the law, and the gaol still carries its dread and its one time odium. Without meaning in the least to condone such irregularities, it is therefore possible to look at them with a little tolerance, at least in the beginning, and not to make them grounds

for withholding from them the necessary facilities in the shape of funds and authority to discharge their duties satisfactorily. Not many years ago the 'Local Funds' was the head to which many items of expenditure which may not bear strict scrutiny were often debited, and these included roads or lighting in places which 'happened' to be close to or within the Collector's bungalow! Readers of Rivett Carnac's reminiscences may recall how the expenses of feeding and doctoring a tiger marked down for a Viceregal shoot (which ultimately did not come off) were debited to "Local Funds" and the tiger was ever afterwards referred to as the Local Fund tiger!

The Panchayats are assigned very great importance in the Constitution, and very properly so, thus: "They have given the Constitution a national character, inasmuch as the Panchayats, the most valuable of surviving democratic institutions of ancient India, have found a place in the country's constitutional structure." ("Our Constitution", Government of India Publication.) All efforts should be therefore directed towards making them efficient instruments in the work of rural improvement. Their present condition no doubt leaves much to be desired, although one is not justified in holding the view that they exist only on paper, as the *Hindu* of Madras, a paper though of singularly sober and restrained views, observed recently, thus "Mr. Nehru wants panchayats and village communities to think of it (the Five Year Plan) and to make their proposals. But this is wishful thinking, for panchayats and village communities exist only on paper."—*The Hindu*, 24th January 1954. This, it strikes me, is far too sweeping a remark, but it is a measure of the need of the changes I have indicated for making them efficient instruments in rural improvement and village administration.

It should not be forgotten that the essential feature of the present campaign is the important place assigned to the people as a 'participant' along with the Central and State Governments and though some of the schemes can be

executed by what may be called authoritarian methods easily and quickly without expecting or waiting for the people's initiative or share, such action is ruled out, and even at the risk of delay action has to be taken with the people as an equal participant. And what better organisation can be thought of than the recognised statutory body of the villagers' representatives elected on a democratic basis, such as the Village Panchayats ? If need be, it may be possible to have special economic or development committees functioning within the Panchayats, to which important persons whose co-operation and advice will be valuable may be invited on particular occasions or these and a few representatives of other interests may be put on as *Ad Hoc* members. Such an arrangement will enable other useful members of the community both to render service and to share authority, although they may not be elected members of the Panchayats. To set up (as an alternative) a separate and parallel organisation independent of the Panchayats may make them lukewarm if not definitely antagonistic, which is a situation to be avoided like poison. Despite their well-known shortcomings, Panchayats should not be ignored but should be strengthened and developed so as to shoulder these new and additional duties.

Difficulties not so great as they are made out.—Moreover it may be found on closer examination that the difficulty of getting the people, *i.e.*, community to participate is not as real or great as it may appear. For instance: the various agricultural improvements which bulk so largely in the programmes are matters for individual action, barring a few exceptions; in respect of education the time is past for the need of a Government drive, the people clamour for it and will gladly do their bit by way of constructing or assisting in the construction of school buildings, or presenting land or helping in other substantial ways. In respect of medical aid too, there are philanthropists whose number is increasing, and who come forward with liberal funds to build a dispensary, or a ward, or a maternity home, or a veterinary dispensary

and it is the Government which has to find the funds to run the hospital. In the past, Government used to be very reluctant and hesitate a great deal before accepting such gifts, as it involved committal to annual recurring expenditure of large sums. The provision of drinking water wells, which is a much needed amenity greatly appreciated at all times, has always been the concern and function of Government, and if these are speeded up in the new set-up, they will besides affording greater relief, help forward progress in other directions as well. In respect of sanitation, it is as much a matter of individual concern as that of the community, and within the limitations imposed by the present type of streets and houses (as pointed out already) individual householders can easily be persuaded to effect improvements like soak pits, improved latrines and so on, if they are demonstrated, while the community will not be unwilling to employ sweepers and scavengers. Compost making has been made obligatory on the larger Panchayats and the financial help (or 'participation') of the Government will be eagerly welcomed and the improvement carried out without further ado. Other sanitary measures too come in the same category. Mosquito control measures are carried out by Government, and as the benefits come to be appreciated, the villagers may be expected to continue them if necessary, but in any case no communal action is called for, at the commencement.

It is mostly in the case of the larger works like the opening of roads, repairs to tanks and canals, that considerable preliminary work of explanation, persuasion, etc., may be required, but even here there are encouraging signs, *viz.*, the eagerness and importunity of the villagers in the concerned tract for improving and repairing their tanks, and the enthusiastic participation of the people in the work of making new roads to serve a number of villages, which is reported as a feature of the Community Projects in different parts of the country. A little patience and persuasive methods cannot fail to wear down any indifference or unwillingness

on the part of the villagers, under these circumstances. Matters like industries, training schools and such like, are obviously too large for any communal action and can be started only by Government in any manner which may appear to them to be most suitable.

Without trying or meaning to underestimate the difficulties I venture to think that when we 'come down to brass tacks' so to speak, the difficulties in the way of securing popular participation are not so great as is generally made out. The work of the Panchayats in the spheres which are distinctly theirs will be seen to be not so burdensome as it may appear. Each successful achievement moreover will make the succeeding one easier, and with so much being attempted on every side enthusiasm may become catching and give rise to a spirit of healthy emulation between the villages in the different project areas.

Executive staff.—While the responsibility for having the improvements carried out in these spheres of every-day importance may rest with and be assigned to the Panchayats, the actual execution will have to be left to regular paid officers, specially trained for this work, who will constantly look into every detail, see what is necessary at every stage, both inside the village and outside on the fields and gardens, and have them attended to by the concerned villager or villagers, themselves. What was being done by an Agricultural Inspector (or Demonstrator), or a Sanitary Inspector, or an Educational Officer at long intervals during their periodical and irregular visits is to be attended to as an every-day work by a man on the spot. He is naturally expected to be sufficiently qualified for the multifarious duties devolving upon him. Agriculture in its broadest sense including both crop and animal husbandry being far and away the most important concern or occupation of the villages, his main qualification will relate to agriculture, but will include knowledge and experience in other fields as well. What is expected of these officers now proposed to be called village level workers, will be seen from the following: 'He is a multi-

purpose man and his interest should comprehend almost anything that affects rural life. He ought to know a good bit of agriculture and animal husbandry, he must have the rudiments of engineering skill and knowledge in road construction, he should have a working knowledge of health and sanitation measures and finally he must act as the friend and guide to all villagers in their daily life. He is the Government's man on the spot and to the extent to which he is helpful to the people they will consider the Government helpful. To find one with so many qualifications is not easy. Proper training is therefore necessary.'—P.I.B. All this is unexceptionable and we can heartily say 'Amen'.

I have already in a previous chapter gone into the matter of the training suitable for such man, the essence of which is that agricultural graduates should be selected and a further training given to them in separate Extension Training classes as is being done now, or as part of the college course as a kind of post-graduate training for this special work. In practice it will be very difficult to discover and secure these paragons of perfection in the numbers required. Moreover it is considered that a multi-purpose man will be of the 'Jack of all trades and master of none' type and that it will be therefore advisable to have separate men for the different branches of rural life. Desirable as this course may appear it is obviously unthinkable that each village or group of villages can be provided with such men; the cost will be colossal and even under the present provision of liberal funds will be impossible.

For a man with good agricultural training such as a regular college or even a school with a two years' intensive course affords, it will be possible with the additional training in the extension service provided for, to become a sufficiently passable specimen of the type desired, who may be expected to become very competent indeed with experience, especially if he is stationed in a particular charge for a period of five years undisturbed. As a matter of fact a distinguished recent visitor who is usually very critical in his judgment

and whose opinion is entitled to great value informed me that he was much struck with the enthusiasm and ability of the young men entrusted with this work and with the amount of the villagers' confidence which they had gained. It cannot be too optimistic to expect therefore that multi-purpose or 'Jack of all trades' executive as they may be, they will be able to do the work expected of them.

The new set-up of the Community Projects makes it also somewhat easy for them to do so, because it provides for specialised officers of each of the departments at the taluk or project headquarters level, with whom they could be in close contact and have particular needs like veterinary help, spraying for plant pests and diseases, manurial doses for application to the different crops, etc., promptly and efficiently attended to. "The Projects Officers are given technical and other staff required for field operations. On an average, the minimum field staff of each project area consists of an agricultural or development engineer, agricultural officers, overseers, district co-operation officers, social education organisers, veterinary doctors, and about twenty village level workers."—"Community Projects in India," by Homi J. H. Taleyarkhan. This is a very liberal complement of a composite staff, and no projects area can complain or fail for want of staff. In fact one can visualise a very embarrassing situation if all or even a few of them should descend upon a village at one and the same time. Still the village level workers have the very best chances for success with so many specialists to look up to for prompt help and service. Their task may be simplified into one of bringing in the timely help of one or other of these officers concerned where he cannot attend to the matter himself, so that as far as the work or the needs of any situation are concerned it will be attended to so quickly as if he did it himself. He will be the eyes and ears of the higher staff, be quick to observe, to be everywhere, and to see and hear everything and do the needful or get it done at once. A certain amount of 'handiness' on his part, such as is included, for instance, in a boy

scout's training will always be appreciated, whether it be on the field or in the farmer's house and should be cultivated. As time goes on and his familiarity with the villagers grows and their confidence is won, there is no doubt that the villagers will look to him for advice and assistance in many matters and that he will develop into the "friend, philosopher and guide" that he is expected to be. If moreover he is imbued with a zeal and a genuine love for the work, his success will be all the greater. Indeed I have some faint hope that this opportunity will throw up a man of this type here and a man there and the people will venerate him and be drawn to him almost as to a saint. In the earlier days of the village improvement campaign when village level workers called 'Gramasudarakas' in Mysore were functioning, many of them possessed little beyond this zeal and lacked the knowledge and training now being imparted to the present type of workers (who are to be called 'Gramasevakas'), not to mention the expert help provided on a liberal scale, and this lack was the reason for their failure. The more valuable and material part of the requirement being now provided it is up to them to cultivate the necessary zeal and mental equipment like a genuine missionary.

It is a pleasure to note in this connection that women's welfare has not been neglected, and due provision has been made for the employment of workers called Gramasevikas, trained by the Kasturba Trust. Their training enables them to impart the knowledge of child and maternity welfare, domestic service, social education, and small crafts like embroidery, knitting and spinning to the village womenfolk. It is reported that their number is to be increased. Their work even now among the womenfolk has been called "amazingly splendid" (S. K. Dey).

It may perhaps occur to many that it may be well to enlist the services of religious organisations like the Ramakrishna Mission in some selected centres at least; their record of work of a similar character has been not only praiseworthy but also efficient, and no doubt they may give

a very good account of themselves in this field also. It may, on the other hand, be a risky proceeding to import a religious element in these matters, as most villages are already strongly divided by religious or sectarian differences and the patronage given to one religion or sect may be demanded by others as well, a claim which cannot be disregarded in a secular state. It appears however that other agencies than Government though not religious in character, like the Bharat Sevak Sangh, the Prantya Raksha Dal, and the Red Cross are taking a hand in this campaign, and have accomplished much also. But it is to be noted that the prompt execution alone is not the sole test or aim of the project schemes, for as was stated recently by the Community Projects Administrator, Mr. S. K. Dey, " They could do it all by Government agency with foreign help, but they wanted the people to co-operate and become partners " which is evidently more important though more difficult and time-consuming.

Work already accomplished—a good augury for the future.—The schemes are everywhere only in the initial stage, and in many states have not even begun. All reports however indicate that even within this short period of operations in certain states notably in Bombay, the amount of work turned out largely through the voluntary labour of the villagers is astonishing, and augurs well for the future. A list of these works can be found in the book " Community Projects in India ", by Homi J. H. Taleyarkan. In the U.P. under the Shramadan Movement ' voluntary ' labour weeks have been observed by the people, in the first of which (from 26th to 31st January 1953) it is reported that 5,200 miles of new roads were made, 3,200 miles of old roads were repaired, 384 panchayat ghars (halls) and 59 school buildings were constructed, and 240 wells and 120 miles of irrigation channels were dug. In the second drive (1st May to 15th May 1953) 8,000 tanks were deepened, 6,340 miles of guls were cleared and 983 bunds constructed resulting in an increased irrigation of 1 lakh of acres. The total cost of the

work turned out is estimated at Rs. 1 crore and 20 lakhs, but the actual expenditure was almost nominal. All this work has stood the heavy rains well. The third drive was from 26th January to 2nd February 1954. In 29 districts alone (from which reports have been received) 3,500 miles of new roads, repairs to 7,000 miles of old roads, construction and repairs of 72 school buildings, 631 panchayat ghars, 139 miles of drains and channels have been taken up ".—(The Shramadan Movement in U.P., published in the *Hindu*, 21st February 1954.) Complete figures for the various kinds of work accomplished in the different Community Projects and Extension areas are given in the recently published Evaluation Report on these projects, from which it will be seen that despite the difficulties inseparable from such schemes in the initial stages, a commendable bulk of work has been turned out already, which augurs well for steady and sustained progress. The work achieved by the members of the N.C.C. (National Cadet Corps) in different parts of the country which have been reported in the papers comes in a class by itself and forms a brilliant record worthy of all praise. Some notable examples are the making of a seven-mile road through jungle in the Shimoga District, and the construction of an irrigation tank capable of irrigating 72 acres and of a canal two miles long in connection therewith, in the Madura District by a company of 800 cadets working for 20 days. Such a gesture from the rising intelligentsia of the country, the cream of our educated youth and the future leaders and administrators, is something to be proud of, and one can only exclaim (if we may vary the theme of the poet) 'Breathes there the man with soul so dead' among our villagers who is not touched and inspired by this superabundance of enthusiastic service for their benefit, and stimulated to respond and give his full measure of co-operation in fulfilling the objects of these beneficent activities? The work turned out by these Community Projects and National Extension Service Centres already has been pronounced very gratifying and the practical

enthusiasm and the spirit of self-help and co-operation evinced by the people concerned surprising and something to be proud of. So encouraging indeed have these been that the movement is to be speeded up and their numbers so largely increased that the benefits of these many-sided schemes of rural welfare will spread over the whole country and within the shortest possible time. On the general and larger economic front, schemes of vast magnitude have been set on foot and the progress already achieved is almost breath-taking. Education of all kinds, especially higher scientific and technical, irrigation and electric power projects on a stupendous scale, communication and transport developments by road, rail, sea and air, basic industries of great importance like iron, steel, strategic materials, chemicals, fertilisers, etc., huge manufacturing enterprises like those for locomotives, ships, engines, motors, automobiles and even aeroplanes, innumerable factories and mills on the private sector like cotton, rayon, sugar, and a large variety of consumer goods, and similar activities which have converted the country from one having to import everything from a pin or a tack-nail upwards, into one not only self-sufficient but even an exporting country of growing importance—these achievements are nothing short of astonishing both in their magnitude and the speed of execution. Two years more of the first Five-Year Plan are still to run and the second Five-Year Plan is already being worked out, which will cover a wider field and also accelerate progress. It is indeed the dawn of a new era which we are witnessing, a radiant dawn dispelling the darkness of poverty, dirt and disease and heralding the advent of a new and prosperous India, about which we can feel and say,

> "Bliss was it in that dawn to be alive
> But to be young was very heaven."

XIV. ADDENDUM

The following extract containing lists of the various rural industries comprised in and suggested for being taken up by the Mysore Rural Industrialisation Scheme, referred to on page 78 of the text, will be found both interesting and useful:—

The total production achieved is contributed by 5,933 industries, among which the following types may be mentioned to indicate most of the common industries and a few special industries which were encouraged during the implementation of the Scheme.

1. Carpentry works.
2. Smithy works.
3. Pottery works.
4. Coffee Grinding works.
5. Mat weaving.
6. Kambli weaving.
7. Power loom weaving.
8. Dyeing and Printing works.
9. Silk reeling.
10. Milk creaming.
11. Dairy Farm.
12. Cement floor tile works.
13. Grainage (Sericulture).
14. Printing Press.
15. Druggets manufacture.
16. Tile Factory.
17. Coir rope making.
18. Soapnut powder manufacture.
19. Fire works.
20. Candle manufacture.

Special Industries started or expanded

1. Manufacture of automobile and bicycle pumps.
2. Conduit pipe manufacture.

3. Apparel industry by electric power.
4. Saw Mill.
5. Silk reeling by improved basins.
6. Silk twisting works.
7. Disintegrator for soapnut powder manufacturing.
8. Rotary oil mill.
9. Lacquerware works.
10. Ink powder manufacturing.
11. Coir rope manufacturing.
12. Utensil ware manufacturing.
13. Persian wheel manufacturing (Irrigation).
14. Tobacco curing.
15. Printing and Dyeing works.

Sir M. Visvesvaraya, Chairman, Central Committee, has advised that the following industries are remunerative. Propaganda is being carried on and efforts are being made to popularise them.

1. Weaving (cotton, woollen, tussore, jute, matka, etc., hand and power looms).
2. Dairy farming—milk and milk products, such as butter, cheese, ghee and marketing the same.
3. Poultry farming.
4. Bee-keeping.
5. Sericulture.
6. Combined private workshops—smithy and carpentry.
7. Oil pressing.
8. Lime and cement manufacture.
9. Bamboo work, including garden furniture, basket-ware, matting.
10. Metal-ware (Vessels of iron, steel, copper, brass, aluminium, etc.).
11. Leather goods making (Boots, shoes, chappals, slippers, bed-straps, bags, packets, etc.).
    Leather tanning.
12. Coir—Coir rope and mat-making, etc.
13. Fruit and vegetable growing, fruit canning, jams, jellies and preserves.

14. Mat weaving.
15. Charcoal manufacture.
16. Bakery and confectionery.
17. Fisheries—fish oils, fish curing, fish-canning, dry fish, etc.
18. Food products, spices, condiments, pickles, sauces, etc.
19. Jaggery manufacture (to improve).
20. Cattle and sheep breeding.
21. Collection of manures, oilcakes, bonemeal, farm-yard manure, compost, etc.
22. Provision and oilman's stores, to prepare centres for the manufacture of supplies to centres like Bangalore.
23. Rice and Flour milling.
24. Aerated Water Factories.
25. Factory and Ready-made dress.
26. Collection of Aloe fibre extraction—Palmyra, cocoa-nut fibres, flax.
27. Bedding and blankets.
28. Button making.
29. Carpet weaving—Druggets manufacture.
30. Knitting and needle work.
31. Hosiery and shoe laces.
32. Ornaments and Jewellery.
33. Silk reeling, silk-worm rearing, weaving.
34. Umbrella making.
35. Spinning including charka.
36. Wooden-ware, wooden-sandals, vessels, etc., wood-sawing, wooden furniture, manufacturing cots, benches, railway sleepers, etc.
37. Wool clipping and grading.

—*Rural Industrialisation* (Government of Mysore).—Its working in Bangalore and Kolar Districts, 1951–1952–1953.—*Mysore Government Press*.

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1024–54 Printed at The Bangalore Press, Bangalore City, by C. Vasudeva Rao, Superintendent.

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